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Vol. 13 JUNE, 1924 No. 6

ENTRIES 4063–4768

AGRONOMY

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(See also in this issue Entries 4145, 4191, 4258, 4264, 4543, 4562, 4579, 4597, 4637, 4665, 4685 4686, 4697, 4698, 4719, 4722, 4740, 4741)

4063. ANONYMOUS. **Continued progress in India.** [An editorial on progress, reported by private letters sent from the Cane-breeding Station at Coimbatore, WYNNE SAYER in charge.] Internat. Sugar Jour. 25: 620–621. 1923.—The Coimbatore seedlings Co 210, Co 214, Co 232 and CO 13 have produced splendid crops. The drought affected their growth differently. The introduction of these canes alters the milling season as they are ready to grind before the local ones. It appears possible that a cane crop can be matured at the other end of the milling season. The new canes produce about double the amount of sugar obtained from the local cane. The method of short-planting, introduced from Java, probably will become a part of the annual agricultural routine. This method applied to the rapid multiplication of newly-introduced varieties can save as much as 3 years. Also by this method the planting time need not be dominated by the harvesting season, as the canes can be planted at the end as well as at the beginning of the hot, dry season. The canes appear to be ratooning well.—*C. Rumbold.*

4064. ANONYMOUS. **Das Schulgut Uhřiněves. [The school property at Uhřiněves.]** Wiener Landw. Zeitg. 73: 407–409. *6 fig.* 1923.—This is a description of the experimental farm recently established by the Technical High School of Prague. An account is given of the problems under investigation, rotation practiced, buildings and equipment available, etc.—*F. Weiss.*

4065. ANONYMOUS. [Rev. of: DUDGEON, GERALD C. **The agricultural and forest products of British West Africa.** (Imperial Institute Handbooks.) *2d ed., xii + 176 p., 36 fig.* J. Murray: London, 1922 (see Bot. Absts. 13, Entry 4077).] Nature 110: 210–211. 1922.

4066. B[ARBER], C. A. **Recent work in cane agriculture.** [Rev. of: ALI, MALIK SULTAN. **Coimbatore Seedling 205 (flowering variety).** Department of Agriculture, Punjab, Leaflet No. 22. 1923.] Internat. Sugar Jour. 25: 644–645. 1923.—This is a government report after several years' trial of a new cane seedling introduced from Coimbatore into the Gurdaspur Circle of the Punjab. This tract lies about 1,000 miles northwest of Bihar and is thickly planted with sugar cane, in the main comprising the North Indian sugar cane tract for which these seedlings were designed. The parentage of Co 205 is given as a thick tropical cane

crossed by *Kahi*, the latter a local form of *Saccharum spontaneum*, a pestilential weed in the fields. The seedling grows vigorously under most soil and climatic conditions. It does well on poor soils in dry years. It is a tall thin cane having a deep root system with long sets and a hard rind, disease resistant, does not easily lodge or suffer from drought, requires less irrigation than ordinary canes, and is a heavy yielder. In three-years' trials at Gurdaspur farm cultivated *barnai* yielded 50% more gur than local canes; on irrigated land the increase in yield was 20%. The cane ripens slowly, the juice is thin and the percentage of sucrose less than in ordinary cane, but this is compensated for by the increased yield. It generally comes to flower, but this is not alarming.—*C. Rumbold.*

4067. B[arber], C. A. **Recent work in cane agriculture.** [Review, with permission, of: **Annual Rept. (in manuscript) Cane-Breeding Station Coimbatore for year ending March, 1922.**] Internat. Sugar Jour. 25: 645. 1923.—Studies on cane pollen were continued. The raising to maturity of 11,000 seedlings for testing their juices has caused a new routine of culture at the station. The seedlings are planted just before July–August (wet season), making a subsidiary planting season detached from the regular milling one. The ordinary planting time for seedlings is March-April. This procedure permits 2 analyzing periods. Further, by short-planting the original seedlings are not planted out but cuttings obtained from them,—thus ruling out some of the abnormal vigor of the seedlings.—*C. Rumbold.*

4068. Baughman, Walter, F., and George S. Jamieson. **The constituents of "Chufa" oil, a fatty oil from the tubers of Cyperus esculentus Linné.** Jour. Agric. Res. 26: 77–82. 1923.—The oil consisted of the glycerides of the following acids: myristic, trace, palmitic 11.8%, stearic 5.2%, arachidic 0.5%, lignoceric 0.3%, oleic 73.3%, linolic 5.9%, and non-fatty material (by difference 3.0%). A phytosterol (melting point 134–135°C.) was isolated from the unsaponifiable matter. Characteristics of the oil are given in detail.—*W. F. Baughman.*

4069. Besley, H. J., E. G. Boerner, and B. E. Rothgeb. **United States grades for grain sorghums.** U. S. Dept. Agric. Dept. Circ. 245. *7 p.* 1922.—Grades for grading and marketing of the grain sorghums recommended by the U. S. Department of Agriculture are given.—*L. R. Hesler.*

4070. Burt, B. C. **Cawnpore-American cotton.** Agric. Res. Inst., Pusa Bull. 126. *13 p.* 1923.—A pure race of Cawmpore-American cotton has been isolated which yields well even under adverse conditions, and which has a long staple of good quality. It is known as Ca 9 and the seed is being distributed to replace the ordinary Cawnpore-American.—*N. J. Giddings.*

4071. Burt, B. C., Albert Howard, and Gabrielle L. C. Howard. **Pusa 12 and Pusa 4 in the Central Circle of the United Provinces.** Agric. Res. Inst. Pusa Bull. 122. *34 p., 1 pl.* 1921.—Report is made on the milling tests, comparative yields and methods of seed distribution of 2 improved varieties of wheat in India.—*R. J. Garber.*

4072. Clark, J. Allen, and L. R. Waldron. **Kota wheat.** U. S. Dept. Agric. Dept. Circ. 280. *16 p., 6 fig.* 1923.—Kota is a common bearded wheat of the hard red spring class. It was introduced from Russia and was developed concurrently by the U. S. Department of Agriculture and the North Dakota Agricultural Experiment Station. It is resistant to the principal forms of stem rust which occur in the hard red spring wheat region. Kota is promising in other respects (drought-resistance, yield, milling and baking), and is best adapted to the durum district.—*L. R. Hesler.*

4073. Cook, Charles C. **A study of an alfalfa crop enterprise upon a commercial dairy farm in New Jersey.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 292–305. *1 pl., 4 fig.* 1921/ 22 [1924].—In the 11-year period which this survey covers the yield per acre varied from 1.63 to 3.67 tons and the cost per ton increased from $7.46 in 1922 to $47.16 in 1921. Some consideration is given the influence of local conditions on profits.—*Wm. H. Martin.*

4074. D., W. D. **Effect of selection of "seed" on the yield of the potato crop.** Jour. Dept. Agric. Ireland 22: 378–380. 1923.—In 5 out of 7 varieties tested, the selection of seed tubers from high producing plants was followed in comparison with non-selection, by greater plant vigor, which in 3 varieties was correlated with a lower percentage of leafroll and in 4 with a higher yield rate of salable tubers.—*Donald Folsom.*

4075. DACHNOWSKI, ALFRED P. **Preparation of peat composts.** U. S. Dept. Agric. Dept. Circ. 252. *12 p.* 1922.—The author discusses advantages involved, kinds of peat, structure of deposits, excavating peat, and relative values of peat composts.—*L. R. Hesler.*

4076. DAFERT, F. W. **Beiträge Russlands zur Lösung schwebender agrikulturcheimscher Fragen. [Russian contributions to the solution of agricultural-chemical problems.]** [Rev. of: PRJANISCHNIKOW, D. N. **Die Düngerlehre. (Treatise on fertilizers.)** German trans. by M. v. WRANGELL. *8°, xii + 450 p., 84 fig.* P. Parey: Berlin, 1923.] Wiener Landw. Ztg. **73:** 415–416. 1923.—This new work has grown out of a textbook on agricultural chemistry, and as it now stands is a statement of the work of Russian agricultural experiment stations in this field during the period 1890–1915. The reviewer finds the sections dealing with the relations of phosphorus to plant growth, and with substitutes for mineral phosphate fertilizer of particular value under present Austrian conditions.—*F. Weiss.*

4077. DUDGEON, GERALD C. **The agricultural and forest products of British West Africa.** *2d ed., xii + 176 p., 36 fig.* J. Murray: London, 1922.—This book is one of the Imperial Institute series of handbooks edited by W. R. DUNSTAN which deal with the commercial resources of the tropics. The provinces discussed are Gambia, Sierra Leone, Gold Coast, Ashanti and Northern Territories, and Nigeria. Groundnut (*Arachis hypogea*), guinea corn (*Sorghum vulgare*), maize, (*Zea Mays*), cassava (*Manihot* sp)., yams (*Dioscorea* sp.), and sweet potatoes, (*Ipomoea batatas*) are the principal food crops in all of these provinces, although the relative importance of the different kinds varies. Pearl millet (*Pennisetum typhoideum*) often takes the place of guinea corn or maize, and rice, (*Oryza sativa*) is grown to a small extent as a wet-land crop, except in Sierra Leone where it is the most important food crop.—Other products more or less common to these provinces are rubber from *Funtumia elastica, Landolphia owariensis, L. Hendelottii,* and *Ficus* sp.; palm oil from *Elaeis guineensis;* dyes from camwood (*Baphia nitida*) and indigo (*Indigofera* sp.), and a blue dye from *Lonchocarpus cyanescens;* Shea-butter from *Butyrospermum Parkii;* Kola-nut from *Kola accuminata;* cocoa from the introduced *Theobroma cacao;* wood-oil from *Daniella thurifera;* Copal, a resin from *Copaifera guibourtiana* and *Cyanthyrsus oblongus* (the latter termed "Accra copal"); gums are derived from several species of *Acacia* and fiber from *Hibiscus* sp. Three of 4 varieties of cotton including tree cotton (*Gossypium arboreum*) are cultivated; the fiber from several of these is longer than "American middling" but deficient in color. [See also Bot. Absts. 13, Entry 4065.]—*H. N. Vinall.*

4078. FOSTER, L. D. **Testing of New Zealand grown wheats.** New Zealand Jour. Agric. **27:** 89–95. 1923.—A study of quality of flour.—*N. J. Giddings.*

4079. FOY, NELSON R. **Dodder in New Zealand grown clovers.** New Zealand Jour. Agric. **27:** 19–20. 1923.—A small amount of dodder seed has been reported in exported clover seed. Particular care is urged to prevent further shipments of such seed.—*N. J. Giddings.*

4080. FRUERGAARD, J. S. **Metoder og Principper for Foderroeforaedling. [Methods and principles for producing turnips and sugar beets.]** Tidsskr. Planteavl **29:** 817–851. 1923. —Methods used at 10 Danish experiment stations in yield and breeding experiments with turnips and sugar beets are explained.—*Albert A. Hansen.*

4081. GILE, P. L., AND J. O. CARRERO. **Efficiencies of phosphatic fertilizers as affected by liming and by the length of time the phosphates remained in Porto Rican soils.** Jour. Agric. Res. **25:** 171–194. *1 fig.* 1923.—Vegetative experiments involving approximately 1,600 pots were conducted with millet (*Setaria italica*) as a test crop to determine quantitatively how the relative efficiencies of acid phosphate, rock phosphate, bone meal, basic slag and double superphosphate were affected by liming and by the length of time the phosphates remained in the unplanted soil. Nine types of soil were used and the plan of the experiments was that previously suggested by the authors (Jour. Amer. Soc. Agron. **8:** 247–255). The relative efficiencies of the phosphates varied widely in different soils. Applications of lime equivalent to the "lime requirement" of the soil (Veitch method) increased, decreased, or were without appreciable effect on the efficiencies of acid phosphate, basic slag and double superphosphate, according to the character of the soil. Liming reduced the efficiencies of bone meal and rock phosphate more generally and to a greater degree. When the phosphates remained 6 weeks in the soil before planting, the efficiencies of all phosphates (except rock phosphate in the unlimed soil) were diminished appreciably in all soils, whether limed or not. Most of the loss in efficiency took place during the first 20 days.—*P. L. Gile.*

4082. Guicherd, G., et E. Marre. **L'Agriculture de l'Aveyron. [A monograph of agriculture in the department of Aveyron.]** *86 p., 10 fig.* Rodez, 1923.—That part of the French Massif Central which is administratively known as Aveyron contains many widely differing geological regions, the agronomic possibilities of which are here discussed. Liming made wheat culture possible where rye only could be grown on the granites and schists of the "Segala" region. Sheep are extensively fed on the grass of the calcareous "Causses" as their milk is in great demand for the manufacture of Roquefort cheese.—*J. Dufrenoy.*

4083. Hansen, Dan. **The work of the Huntley reclamation project experiment farm in 1920.** U. S. Dept. Agric. Dept. Circ. 204. *31 p.* 1921.—Crop-rotation experiments, silage crop tests, dry-land agriculture, crop-utilization and pasturing experiments are discussed.—*L. R. Hesler.*

4084. Hansen, Dan. **The work of the Huntley reclamation project experiment farm in 1921.** U. S. Dept. Agric. Dept. Circ. 275. *25 p.* 1923.—Crop rotation experiments are reported with alfalfa, sugar beets, potatoes, oats, wheat, corn and flax, and experiments with silage crops, as corn and sunflowers. Dryland agriculture and crop utilization experiments include an extensive series of rotations in which winter wheat, spring wheat, oats, barley, flax, corn, peas, rye, sweet clover, alfalfa and brome grass are grown in various combinations and with several cultural systems. A series of variety tests with potatoes, grains, beans, vegetables and forage crops has also been conducted.—*Mary R. Burr.*

4085. Headley, F. B., and H. W. Knight. **The work of the Newlands relcamation project experiment farm in 1920 and 1921.** U. S. Dept. Agric. Dept. Circ. 267. *26 p.* 1923.—Results are reported of comparative tests of sorghum varieties, millets, corn variety tests, effects of manure on crop yields, experiments with pasture grasses, potato experiments, variety tests with tomatoes and cabbage, and reclamation of alkali soils.—*Mary R. Burr.*

4086. Howard, Albert, and Gabrielle L. C. Howard. **The agricultural development of Baluchistan.** Agric. Res. Inst. Pusa Bull. 119. *27 p., 2 fig.* 1921.—The discussion is under 3 headings: (1) agricultural factors of the Quetto Valley; (2) agriculture; and (3) fruit growing.—*N. J. Giddings.*

4087. Howard, Albert, and Gabrielle L. C. Howard. **The saving of irrigation water in wheat growing.** Agric. Res. Inst. Pusa Bull. 118. *22 p.* 1921.—Experiments have shown that there is serious waste of irrigation water in India. One irrigation combined with cultivation gives a higher yield of wheat than is secured by the 7 irrigations usually made by the natives. The growth of leguminous fodder crops is urged.—*N. J. Giddings.*

4088. Howard, Albert, and J. Stewart Remington. **Safflower oil.** Agric. Res. Inst. Pusa Bull. 124. *14 p.* 1921.—Safflower, *Carthamus tinctorius*, seed yields a high percentage of edible oil, which is also a good drying oil. The oil cake is an excellent cattle feed and the flowers of the plant give a reddish dye. Twenty-four types of safflower are described.—*N. J. Giddings.*

4089. King, C. J. **Crop tests at the cooperative testing station, Sacaton, Ariz.** U. S. Dept. Agric. Dept. Circ. 277. *40 p., 27 fig.* 1923.—Among the crops used in tests are: cotton, barley, corn, sorghums, wheat, rye, alfalfa, Rhodes grass, field peas, onions, sweet potatoes, peanuts, flax, melons, fruit, pecans, pomegranates, flowers, ornamental trees and shrubs. Experiments in cotton root-rot control are reported.—*L. R. Hesler.*

4090. Kuhn. **Zweckmässige Anwendung des Kalkstickstoffs in der Landwirtschaft. [Practical application of calcium cyanamide in agriculture.]** Mitteil. Deutsch. Landw. Ges. 38: 592–596. 1923.—This is a general discussion of the practical value of calcium cyanamide as a fertilizer.—*F. M. Schertz.*

4091. Lindhard, E., og H. Bagge. **Forsög med Fröavl af forskellige Graesarter samt Rödklöver og Kaellingetand. [Experiments with different grass seeds for seed crops especially red clover and dog grass (Dactylis glomerata)].** Tidsskr. Planteavl 29: 673–763. 1923.—Danish dairy farmers usually feed soiling crops to milk cattle each morning and evening in the stable, using bran, oilmeal, and similar foods. The main feed, however, is from pastures and the government devotes considerable attention to the production of pure, viable seed. Timothy and clover are much used for horses but not for cattle. Experiments on row planting vs. broadcasting are reported for *Trifolium pratense, Phleum pratense, Avena elatior, Festuca*

pratensis, Lolium italicum, L. perenne, Poa fertilis, and *Lotus corniculatus.* Yield tables are presented. Best results seem to have been secured with row planting.—*Albert A. Hansen.*

4092. LIPMAN, JACOB G., AND AUGUSTINE W. BLAIR. **Report of the Department of Soil Chemistry and Bacteriology.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 345–407. *1 pl.* 1921/22 [1924].—Experiments on the continuous growing of wheat and rye with and without a green manure, crop-season 1921, indicate that it is possible to grow a fair legume green-manure crop between wheat harvest and wheat seeding, and by this means increase the yield of grain by more than 50% over the yield from the corresponding plot continuously in wheat and without a green-manure crop.—The continuous growing of corn with a legume and non-legume green-manure, crop-season 1921, indicates: (A) a legume green-manure has distinctly more value than a non-legume; (B) small applications of farm manure have pronounced beneficial effect as compared with no manure, this influence, however, not always proportional to the amount of manure used; (C) for 100 bushels of corn there is required about 143 pounds of nitrogen; (D) percentage of nitrogen in grain and clover is generally higher from the legume-treated than from the non-legume-treated plots.—Results are also presented of studies of (1) the influence of lime on yield and nitrogen content of soybeans, and (2) residual effect of borax on potatoes and corn.—*Wm. H. Martin.*

4093. MCKEE, ROLAND. **History and seed production of purple vetch.** U. S. Dept. Agric. Dept. Circ. 256. *5 p., 1 fig.* 1923.—A brief history is given of purple vetch seed production in Oregon and California. In 1921 about 1,000,000 pounds were produced in northwestern California and about 125,000 pounds in western Oregon.—*L. R. Hesler.*

4094. MARTIN, WM. H. **The relative vigor of tubers for seed purposes from sprayed and unsprayed plants.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 600. 1921/22 [1924].—The plants produced by tubers from sprayed plants were more vigorous, remained green for a longer period and outyielded those produced by tubers from unsprayed vines.—*Wm. H. Martin.*

4095. MILLER, M. F., AND F. L. DULEY. **Soil experiments on the gravelly Ozark Upland.** Missouri Agric. Exp. Sta., Bull. 202. *22 p., 12 fig.* 1923.—Several years' experiments with fertilizers for corn, soy beans, wheat and clover on the Clarksville gravelly loam of the Ozark Upland are reported. The use of 150 pounds of steamed bonemeal or 16% of acid phosphate increased the yields of all crops and returned a profit of 300–400% on the investment. Manure used with acid phosphate gave a higher net return than any of the other treatments. Soil management for the region based on the results of these experiments is discussed.—*L. J. Stadler.*

4096. NEIDIG, RAY E., AND ROBERT S. SNYDER. **Sweet clover investigations.** Jour. Agric. Res. 24: 795–799. 1923.—Data on yield and composition (crude protein, ether extract, crude fiber, ash, and nitrogen-free extract) of yellow (*Melilotus officinalis*) and white (*M. alba*) sweet clover cut at various stages of growth are presented. Silage was made in quart milk bottles from each variety at the different stages of cutting, and the acidity determined. From the type of acids found and general appearance, all silages appeared to have undergone a normal fermentation and resulted in a normal silage. The early stages of growth show more protein and less crude fiber. These findings are reversed for the later stages of cutting. Sweet clover is a promising crop for silage purposes in localities suffering from adverse conditions of drought and poor soil fertility. Yields are relatively high.—*R. E. Neidig.*

4097. NOLTE, O. **Die Stickstoffdüngungsversuche der D. L. G. im Jahre 1922. [The nitrogenous fertilizer investigations of the German Agricultural Society in 1922.]** Mitteil. Deutsch. Landw. Ges. 38: 429–436. 1923.—The tabular report gives the results of numerous cooperative experiments on various soil types, using winter rye, rye, sugar beets, potatoes, oats. Each of these followed various other crops. Sulphate of ammonia, calcium nitrate, sodium nitrate, and a mixture of ammonium sulphate and potassium nitrate were applied in varying amounts.—*A. J. Pieters.*

4098. PACK, DEAN A. **Time for testing mother beets.** Jour. Agric. Res. 26: 125–150. 1923.—This and other work show that sugar beets lose sugar during storage. The analysis of hundreds of beets in the fall and again in the spring (i.e., before and after storage) shows that individual beets are very irregular in the per cent and amount of sugar lost during storage. Some individuals lose less than 0.1%, while others may lose 50% of their total sugar content.

This irregularity makes very untrustworthy the spring tests for breeding beets. Correlation tables show that beets of high per cent sugar or high sugar content tend to lose more sugar during storage than beets of low per cent sugar or low sugar content. This explains why breeders using spring-tests data tend to select undesirable beets, with the result that their lines may decrease in per cent of sugar and sugar content with succeeding generations. Failure to recognize this erratic variation between fall and spring tests has probably led to confusion in the selection of desirable strains of beets in sugar-beet breeding work. In consideration of these results and the present practice of sugar-beet companies, it is suggested that breeders test their mother beets in the fall, not later than 40 days after harvest.—*Author.*

4099. Power, F. B., and V. K. Chesnut. **Chemical examination of "chufa," the tubers of Cyperus esculentus Linné.** Jour. Agric. Res. 26: 69–75. 1923.—Chufa tubers grown in the U. S. A. were found, like those cultivated in southern Europe, to contain large quantities of sugar, starch and an edible oil. Of these the oil is the most valuable product. Tests indicate the pressure of an enzyme hydrolyzing amygdalin. No alkaloids or other active principles were found in the tubers, and it is therefore suggested that they should be more generally utilized for food than is the case at present.—*V. K. Chesnut.*

4100. Ragsdale, A. C., and C. W. Turner. **Silage investigations. Loss of nutrients in the silo and during the field curing of corn.** Missouri Agric. Exp. Sta. Res. Bull. 65. *10 p.* 1924.—The unavoidable loss of nutrients in silage formation was compared with the loss of nutrients in the field-curing of corn. The average losses in 54 silos were compared with the losses from 16 shocks of corn fodder. The loss of dry matter and of nitrogen-free extract was found to be twice as great in field-cured corn as in silage.—*Authors' abstract.*

4101. Reynolds, E. B., and A. H. Leidigh. **Sulfur as a fertilizer for cotton.** Soil Sci. 14: 435–440. 1922.—Sulphur was applied to plots at the rate of 50, 500, and 1,000 pounds to the acre. Acid phosphate was applied alone or in combination with sulphur at the rate of 400 pounds per acre. The average yield from the sulphur-treated plots was 374.74 pounds of lint cotton per acre; from the sulphur and acid phosphate, 359.08 pounds; from the acid phosphate alone, 259.76 pounds; and from the checks, 276.63 pounds.—*W. J. Robbins.*

4102. Rivière, Charles. **Le Saccharum spontaneum.** Compt. Rend. Acad. Agric. France 1920: 912–916. 1920.—This plant, in addition to its value as a sand binder for dunes, is valuable in preventing erosion in marshy places and along stream banks. It is a good forage plant, especially when young. As a wind break it is undesirable as it encroaches upon the plantings and harbors a dangerous insect, *Sesamia nonagrioides,* which spreads to other plantings.—*E. A. Bessey.*

4103. Schribaux, Emile. (1) **Les nouvelles avoines hybrides de la station d'essais de semences.** [New hybrid oats.] Compt. Rend. Acad. Agric. France 1920: 113–122. 1920. (2) **Les nouvelles avoines noires hybrides de la station d'essais de semences.** [New black oat hybrids.] Ibid 1920: 266–274. 1920.—These 2 articles refer to different trials of the same oat hybrids, 4 crosses of the black oat variety Brie with the white Ligowo oat. The hybrids in comparison with the parent varieties give a larger yield of grain, are more resistant to lodging, have a firmer, less brittle straw, and are slightly earlier than Ligowo, the earlier parent. Their grain characters resemble mainly those of the Ligowo.—*E. A. Bessey.*

4104. Schribaux, Emile. **Modifications à la culture habituelle des pommes de terre.** [Modification of the customary culture of potato.] Compt. Rend. Acad. Agric. France 1920: 930–932. 1920.—The author reports on some experiments by Maisonneuve of Angers. The latter planted single eyes with small bits of adhering peel, and larger pieces each with 1 eye. Both gave larger yields than whole tubers.—*E. A. Bessey.*

4105. Sherrard, G. C. **A summary of the experiments on rice in Bihar and Orissa from 1912 to 1919.** Agric. Res. Inst. Pusa Bull. 96. *64 p.* 1920.—Planting only seed which sinks in a saturated salt solution gave increased yields. Plowing and green manuring are also profitable. Ammonium sulphate was found to be the most generally valuable commercial fertilizer, but potash is needed on some soils. Sulphur deficiency was also noted in certain areas.—*N. J. Giddings.*

4106. Sommer. **Die Ertragsfähigkeit der englischen Kartoffeln im Vergleich mit einheimischen Neuzüchtungen.** [The productiveness of English potatoes as compared with new

domestic varieties.] Wiener Landw. Zeitg. 74: 3. 1924.—The British potato varieties introduced into Austria and Hungary in 1920 to improve seed potato standards have now been tested for 3 years, during which an extreme range of growing conditions has been encountered. In no year have the British varieties equalled the better native sorts; in 1923 they were outyielded 3-fold. This is due partly to the prevalence of degeneration diseases, in addition to late blight, Fusarium rot, and powdery scab, in the stock when received.—*F. Weiss.*

4107. STAFFELD, U. **Originalsaaten oder Absaaten?** [**Grower's original seed or seed grown from original seed?**] Mitteil. Deutsch. Landw. Ges. 38: 601–602. 1923.—The author has brought together the data from all the comparable trials of winter rye, winter wheat, and oats in the trials of the Deutsche Landwirtschaftliche Gesellschaft from 1899 to 1920, and finds that in all of these crops the average returns were higher from the original seed than from that grown from such seed (Absaat).—*A. J. Pieters.*

4108. STANTON, T. R. **Fulghum oats.** U. S. Dept. Agric. Dept. Circ. 193. *11 p., 2 fig.* 1921.—The Fulghum oat is a distinct variety of the red-oat group (*Avena sterilis* L.). It is rapidly coming into favor in several sections of the U. S. A., particularly in the southern winter-oat belt. The Fulghum is awnless, vigorous, erect, of good quality, early, smut-resistant, somewhat resistant to leaf-rust, probably as good a yielder as, or better than, Red Rustproof or Burt varieties.—*L. R. Hesler.*

4109. TAYLOR, C. SOMERS. **Experiments with castor seed conducted at Sabour.** Agric. Res. Inst. Pusa Bull. 117. *10 p.* 1921.—Attempts to isolate high oil-yielding strains have not given very satisfactory results. Cultural practise and environmental factors are believed to have a more important effect upon oil yield than any selection upon the basis of chemical analysis. Analyses are given and a few varieties which seemed to maintain high oil yield have been selected.—*N. J. Giddings.*

4110. TRABUT, L. **Quelques plantes fourragères pour le Nord de l'Afrique.** [**Forage plants for North Africa.**] Compt. Rend. Acad. Agric. France **1920**: 350–352. 1920.—In 1905 the author discovered an annual sorghum resembling *Sorghum halepense.* Seed of this sent to the U. S. A. have been grown there under the name Sudan grass. It is now being widely grown in North Africa. *Chloris gayana* is another good addition to the cultivated forage plants. *Saccharum biflorum* Forsk. has proved of great value as a sand binder on the dunes. Napier grass, *Pennisetum purpureum,* from Rhodesia, has been found of great value in dry regions and its roots are not killed unless the ground freezes deeply.—*E. A. Bessey.*

4111. VENKATRAMAN, T. S. **A preliminary note on the behavior in North India of the first batch of sugar cane seedlings distributed from the Sugarcane Breeding Station, Coimbatore.** Agric. Res. Inst. Bull. 94. *17 p., 6pl., 2 diagr.* 1920.—Twenty-three varieties or seedlings have been tested at various places. These plantings have been scored according to stand, vigor, habit, and tillering. Notes have also been taken as to the "arrowing" and "smutting" of the plants, and they have been analyzed for sugar content. No recommendations as to varieties are made.—*N. J. Giddings.*

4112. WALLACE, H. A., AND E. N. BRESSMAN. **Corn and corn growing.** *253 p., illus.* Wallace Publishing Co.: Des Moines, 1923.—The authors have covered much of the applied subject matter pertaining to the culture and disposition of the corn crop. Diseases and other pests of the corn plant are reviewed. The authors submit their interpretation of the possible origin of dent corns and give their conclusions regarding morphological and physiological relationships. Practical phases of corn improvement work are discussed. One chapter is devoted to heredity in corn, including a list of genetic factors. Corn statistics are presented in considerable detail.—*T. A. Kiesselbach.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W DODGE, *Editor*

CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entries 4064, 4142, 4164, 4168, 4194, 4305, 4365, 4452, 4587)

4113. ANONYMOUS. **Inauguration au laboratoire de biologie végétale de Fontainebleau d'une plaque rappellant sa fondation en 1889, par Gaston Bonnier. [Inauguration at the laboratory of plant biology of Fontainebleau of a plaque commemorating its foundation in 1889 by Gaston Bonnier.]** Rev. Gén. Bot. 35: 433–439. 1923.—Addresses by M. MOLLIARD and V. LUBIMENKO are given.—*J. C. Gilman.*

4114. ALBRECHT, HANS. **Der Einfluss der Naturwissenchaften auf die Praxis der Landwirtschaft. [The influence of natural science on the practice of agriculture.]** Wiener Landw. Zeitg. 73: 366. 1923.—This is an obituary and appreciation of Professor L. Hiltner, president of the Bavarian Agricultural Institute for Plant Culture and Protection, and a natural science and agricultural investigator who contributed much to the improvement of German agriculture. Hiltner died at Munich, June 6, 1923.—*F. Weiss.*

4115. ARTHUR, J. C. **Professor Holway.** Mycologia 15: 242–243. 1923.

4116. BRYK, FELIX. **Bibliotheca Linnaeana. 1:** *52 p.*; **2:** *30 p.*, Felix Bryk: Stockholm, 1923.

4117. DENGLER [Rev. of: PARCHMANN, W. **Mecklenburgische Bestandesverhältnisse und Forstwirtschaft in früheren Jahrhunderten. (Forest conditions and management in previous centuries in Mecklenburg.)** *106 p.* Agric. Dept. Mecklenburg-Schwerin: Rostock, 1921.] Zeitschr. Forst.- u. Jagdw. 54: 561–563. 1922.—The author discusses Parchmann's book, a valuable contribution to the forest history of Germany, by chapters: (1) forest conditions in early centuries; (2) the forest during the Slavic period 400–1000 A.D., and the chief causes of its decrease during the middle ages and later centuries; (3) forest management up to the 19th century. During the early period Parchmann attempts to determine the forest composition from fossil remains secured from marshlands, prehistoric excavations, and the old Slavic names of localities. He places altogether too much confidence in the latter, especially since he prepares a chart of forest conditions based upon existing names. Also, the fact that beech and oak are often referred to in forest ordinances of the 17th and 18th centuries does not indicate a great preponderance of hardwoods over pine from the middle ages to more recent times, but means only that these species were the objects of especial protection.—*J. Roeser.*

4118. HILL, A. W. **The work of the Royal Botanic Gardens, Kew.** Jour. Roy. Soc. Arts 72: 87–102. 1923.

4119. HIRATSUKA, YASUG. **Beekeeping in Japan.** Amer. Bee Jour. 63: 298–299. *Fig. 1–2.* 1923.—Beekeeping in Japan began 1280 years ago with the native bee, *Apis indica.* In 1876 Italian bees were imported from the U. S. A. Since 1906 beekeeping has developed rapidly. American methods are followed almost entirely. There are 6 monthly journals published by supply dealers: Toyo no Yoho (Oriental Beekeeping), Yoho no Tomo (Friend of Beekeepers), Jitsugyo no Yoko (Beekeeping as a Business), Yoho Shishin (Load-stone of Beekeeping), Yoho Kwaii (World of Beekeeping), and the Nippon Yoho Zasshi (Japanese Bee Journal). Extracts are given from the best American and English publications on bees. *Astragalus sinensis* is the most important honey plant, the honey flow lasting about 6 weeks during April and May; the honey is light in color and of good flavor. An average of 100 pounds per colony is obtained. Rape (*Brassica chinensis*), blooming in February, is the earliest source of honey. It yields a yellow honey with a disagreeable flavor. *Rhus succedanea* is abundant in some parts of the country. Bush clover (*Lespedeza bicolor*) is a source of honey on some high mountains. *Eriobotria Patrini* yields honey with a peppermint odor. Buckwheat and orange-trees are also valuable.—*J. H. Lovell.*

4120. JENNINGS. O. E. **Elias Judah Durand.** Bryologist 26: 67. 1923.—Durand was born at Canandaigua, New York, in 1870 and died at St. Paul, Minnesota, in 1922. He taught at Cornell University, University of Missouri, and University of Minnesota. His main work was in the study of Discomycetes. A bibliography of 4 bryological titles is appended.—*E. B. Chamberlain.*

4121. McClintock, Walter. **Old Indian trails.** *336 p.* Houghton Mifflin Co.: Boston, 1923.—The author gives, in an appendix, a list of 66 species of plants used by the Blackfoot Indians for food, medicinal and ceremonial purposes, etc.—*C. A. Weatherby.*

4122. Nuttall, Zelia. **Los jardines del Antiguo México.** [Gardens of ancient Mexico.] México Forest. 1[4]: 3–10. 1923.—Quotations from contemporary writers and historians describe the gardens of Montezuma and other Mexican rulers prior to the Conquest. The first tropical botanical garden in America was established by the elder Montezuma shortly after 1450, at Huaxtepec. It no longer exists. Netzahualcoyotl (1403–1474) established limits beyond which tree cutting was prohibited, to prevent destruction of the forests.—The origin and construction of the "chinampas," erroneously called floating gardens, are described. These were elevated mounds in the shallow lakes or swampy lands near Mexico City, and were used for growing food crops. They were not movable.—*W. N. Sparhawk.*

4123. Stone, Witmer. **Stewardson Brown.** Cassinia, Proc. Delaware Valley Ornith. Club 24: 1–7. 1923. [Text reprinted and repaged. *6 p. Portrait.* 1923.]—Brown was born Apr. 29, 1867 near Wayne Junction, Pennsylvania, was engaged in railroad business 1885–1900, and was assistant curator of the herbarium of the Academy of Natural Sciences at Philadelphia until his death on March 14, 1921. He was an active collector in the West Indies, Florida, and Bermuda, as well as a student of his local flora, and maintained an active interest in ornithology. —C. *W. Dodge.*

4124. Wilbur, Harriette. **The doctrine of signatures.** Catholic World 110: 510–514. 1920.

4125. Witte, H. **History and organization of Swedish Peat Society.** Jour. Amer. Peat Soc. 16: 129–132. 1923.

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

Arthur H. Graves, *Assistant Editor*

(See also in this issue Entry 4154, 4155, 4187, 4207, 4209, 4447, 4630, 4767)

4126. Anonymous. [Rev. of: Wheeler, W. M. **Dry-rot of our academic biology.** Science 57: 61–70. 1923.] Nature 112: 346. 1923.—Some of the suggested defects will provoke sympathetic response in Great Britain.—*O. A. Stevens.*

4127. Clute, Willard N. **Plant names and their meanings.—XVIII. Ericaceae.** Amer. Bot. 30: 5–14. 1924.

4128. Daglish, E. Fitch. **Our wild flowers and how to know them.** (How to know them series.) *8 vo, 127 p., 13 pl.* Thornton Butterworth, Ltd.: London, 1923.—"The most common of our native wild flowers have been arranged, without any regard to scientific classifications, in groups, according to the shape of the blossoms, and these groups again broken up into sections depending on the general colour of the bloom. To simplify still further the task of identification, the plants in each section have been divided under three headings, based on the size of their flowers." The flower shapes are pea-shaped, snapdragon-shaped, funnel-shaped, bell-shaped, thistle-shaped, daisy-shaped, dandelion-shaped, disc-shaped; 5 groups of flowers having, respectively, 3 to more than 6 petals; umbel (inflorescence); and a final group of flower shapes not included in the preceding 14 groups, such as meadow-sweet, wild teasel, common sorrel, cat-tail, and others.—*C. S. Gager.*

4129. Peabody, James Edward, and Arthur Ellsworth Hunt. **Biology and human welfare.** *xii + 584 p., 357 fig.* The Macmillan Co.: New York, 1924.—The plan of this text book for high schools is indicated by this sentence in the preface: "We have become convinced that a given function * * * can be presented more effectively by considering in turn how the process is carried on in plants, in animals, and in the human body than by studying plants, animals, and man as separate units and completing the study of one before taking up the study of the others. * * * The dominating purpose throughout the book is to show the intimate relation of biological science to human welfare." At the end of most of the chapters are summaries and review questions. The three parts of the book are: essential functions of living things; plants and animals in relation to human welfare; additional biological

studies. There are appendices on laboratory equipment, directions for making solutions, apparatus, and preparations, and biology note books and reference books.—*C. S. Gager.*

4130. Strasburger, E., und Max Koernicke. **Das kleine botanische Praktikum für Anfänger: Anleitung zum Selbststudium der mikroskopischen Botanik und Einführung in die mikroskopische Technik. [Small botanical practicum for beginners: guide to the independent study of microscopical botany and introduction to microscopical technique.]** *10th ed., viii + 275 p.* Gustav Fischer: Jena, 1923.

4131. Transeau, E. N., and H. C. Sampson. **Laboratory and field work in general botany.** *vi+ 154 p.* World Book Co.: Yonkers, New York, 1924.—This loose leaf book, $8\frac{5}{16} \times 10\frac{7}{8}$ inches, is designed to accompany Transeau's General Botany, but may be used independently of that text. The outlines are prepared on the theory that "most of the student's time should be spent in seeking answers to questions and in solving problems which he has helped to formulate." Blank spaces and pages afford opportunity of entering drawings and notes adjacent to the printed directions. Morphology, physiology, ecology, genetics, and systematics, are covered; 5 out of 45 subject headings are devoted to cryptogams.—*C. S. Gager.*

4132. Yapp, R. H. **Botany. A junior book for schools.** *xi + 199 p., 159 fig.* Cambridge Univ. Press: Cambridge, 1923.—The book aims to help pupils acquire habits of patient and accurate observation. Drawings, all original, have all been made from actual specimens. All microscopic structure is omitted and the "out-of-doors" aspect of plant life is emphasized. The work is intended primarily for pupils preparing for the primary and junior local examinations of the University of Cambridge, it treats only of spermatophytes, and these are all referred to only by the "common" names by which they are known in England.—*C. S. Gager.*

CYTOLOGY

G. M. Smith, *Editor*

(See also in this issue Entries 4259, 4263, 4427, 4608)

4133. Alvarado, S. **Die Entstehung der Plastiden aus Chondriosomen in den Paraphysen von Mnium cuspidatum. [The origin of plastids from chondriosomes in the paraphyses of Mnium cuspidatum.]** Ber. Deutsch. Bot. Ges. **41**: 85–96. *Pl. 1.* 1923.—These chloroplasts arise from chondriosomes, similar to those described by other investigators for certain flowering plants. The author contends that chloroplasts may develop from chondriosomes only in certain stages of development and that at other stages chloroplasts may arise only from chloroplasts.—*Karl Sax.*

4134. Bannier, Jan Paul. **Untersuchugen über apogame Fortpflanzung bei einigen elementaren Arten von Erophila verna. [Investigations on apogamous reproduction in some elementary species of Erophila verna.]** Rec. Trav. Bot. Néerland. **20**: 1–106. *28 fig.* 1923. —In a number of crossings between 3 elementary species of *Erophila verna* (*Draba verna* L.), namely *E. cochleoides*, *E. confertifolia*, and *E. violaceo-petiolata*, the progeny were always like the maternal parent. The author confirms Lotsy's conjecture that this is the result of apomictic reproduction.—In the somatic cells the chromosomes (24 in *E. confertifolia* and 12 in the 2 others) show a paired arrangement and differ in size. Reduction in the microsporocytes appears to be normal, but the majority of the pollen grains are sterile. In the megasporocyte the early heterotypic prophases occur, but gemini are not formed. All the chromosomes split longitudinally at both divisions, the megaspores and the embryo sac derived from one of them thus being diploid. The diploid egg without being fertilized, develops into an embryo. These 3 elementary species are therefore ooapogamous, and the same is true of 4 others less thoroughly studied. The elementary species (Kleinarten) of *Erophila verna* are probably not true species or sub-species, but apogamously reproducing clones.—In *E. violaceo-petiolata* there is a curious fragmentation of the chromosomes at certain stages of mitosis.—*L. W. Sharp.*

4135. Bulliard, H. et A. Giroud. **Un cas de cristalloïde nucléaire. [A nuclear crystalloid.]** Compt. Rend. Soc. Biol. **89**: 1211–1212. *1 fig.* 1923—Polyhedric, acidophile, homogeneous, polymorphic crystalloids are reported from the nuclei in the epithelium of the digestive tract of a brachiopod, *Terebratulina caput-serpentis* L.—*Oran Raber.*

4136. Buscalioni, L., e G. Roccella. **Sopra alcuni inclusi delle cellule della corteccia secondaria di Lantana alba Milb.** [Some inclusions in the cells of the secondary cortex of Lantana alba.] Malpighia 29: 393–406. *Fig. 1–5.* 1923.—Young plants or portions not entirely developed show in cross section inclusions distributed throughout the cortex. In fresh sections the inclusions appear as yellow, oily, semicircular masses, lying against the walls of the cells.—The majority of the microchemical tests place these cell inclusions in the group to which fats, resins and waxes belong. Although there is no definite specific reagent to distinguish between these substances, the author believes that the inclusions are wax rather than resin or fat. Within certain limits the tests for fats are positive, e.g., the substance is only slightly soluble in water or in cold alcohol, but is soluble in solvents of waxy substances,—ether, chloroform, etc. It is partially resistant to some of these, as for example benzol. It is colored yellow with iodine and sulphuric acid and is insoluble in alkalies and acids.—*Lillian C. Cash.*

4137. Kusnetzowsky, N. **Über vitale Färbung von Bindegewebzellen bei Fettresorption.** [On the vital staining of connective tissue by aid of fat absorption.] Arch. Mikrosk. Anat. 97: 32–45. 1923.—Sub-cutaneous injections of freshly cooked egg yolk particles were given to rabbits, on either side of the abdomen. Variable intravenous injections of a 1% solution of trypan blue followed except in a control which received only the eggs. Peeled off sections of the connective tissue from over the egg punctures were fixed. The investigated material consisted of edematous connective tissue which contained numerous cell forms among which were characteristically swollen fibroblasts. Macrophages or polyblasts were also present in numbers. The results showed that either macrophages or fibroblasts may take up both substances. While the fibroblasts show a relatively small avidity for either, the macrophages show a marked one for the lipoid and took it up in proportion to their proximity to the fatty mass, thereby proportionately loosing their capacity to take up the dyestuff. It may be assumed that all of their receptors had been saturated with fat droplets and none remained to combine with the dyestuff molecules. Cells more distant from the fat mass contained both substances but the greater the lipoid inclusions, the less the dyestuff absorption. The more distant macrophages contained no fat, only dyestuff. It may be concluded then that their receptors unite first with substances which stand in closest juxtaposition. If all receptors are saturated, the capacity to take up other colloidal particles is lost. This means that the affinity of the phagocyte protoplasm is non-specific and if already saturated must be refractory towards other substances of another chemical nature. The nature of the affinity cannot be chemical and probably is physical-chemical or even physical. Apparently, Evan's conception is correct, i.e., that phagocytosis and the absorption of colloidal suspensions are identical phenomena.—*H. C. Sands.*

4138. Litardière, R. de. **Les anomalies de la caryocinese somatique chez le Spinacia oleracea L.** [Anomalies of somatic karyokinesis in Spinacia oleracea.] Rev. Gen. Bot. 35: 369–380. *Pl. 8–9.* 1923.—The observations do not in any way invalidate the constancy in the number of chromosomes, although this assertion may appear slightly paradoxical. The variations in the case of *Spinacia* come under the category of those characterized as abnormal in the author's work on the ferns (1921) and everywhere point to the fact that the gametes of *Spinacia* have the number characteristic for the species.—*J. C. Gilman.*

4139. Sokolska, Julia. **L'appareil de Golgi dans les cellules somatiques et sexuelles (spermatogenèse et oogenèse) de l'Araignée domestique (Tegenaria domestica). Division inégale ou manque de division pendant la mitose.** [The Golgi apparatus in somatic and sexual cells (spermatogenesis and oogenesis) of the house spider, Tegenaria domestica. Unequal division or lack of division during mitosis.] Compt. Rend. Soc. Biol. 89: 1395–1396. 1923.

ECOLOGY AND PLANT GEOGRAPHY

Geo. D. Fuller, *Editor*

(See also in this issue Entries 4119, 4190, 4204, 4208, 4212, 4264, 4348, 4370, 4412, 4490, 4719, 4725, 4746)

GENERAL, FACTORS, MEASUREMENTS

4140. Bailey, I. W. **Form and growth of trees.** Bot. Gaz. 70: 159–162. 1920.—A critical review is given of the work of several workers, including Engler and Jaccard, on the factors that determine the form and structure of arborescent plants. The influence of polarity, of water-flow, of nutrition, of gravity and of temperature are discussed.—*Geo. D. Fuller.*

4141. Buxton, P. A. **The temperature of the surface of deserts.** Jour. Ecology 12: 127–134. 1924.—This author reports that the temperature of the surface of a soft desert may be obtained by laying a mercury thermometer (preferably small-bulbed and maximum registering) on it, and sprinkling it with dust or sand; that of a hard desert by dropping on it shavings of paraffin waxes of various melting points.—In Jerusalem (32°N.) surface temperatures of 55–62°C. are experienced in summer. Very great differences may be observed in places only a few yards apart, owing to reflected radiant heat, and differences in the inclination of the surface of the soil.—*Geo. D. Fuller.*

4142. Chodat, R. **La Linnaea.** Echo des Alps No. 12. *16 p., 3 pl.* 1922.—The author describes "La Linnaea" as the oldest of existing alpine gardens. Founded by H. Correvon and his associates about 1889 it has become connected with the Botanical Institute of the University of Geneva. It is located at Bourg-Saint-Pierre (Switzerland), includes a variety of habitats, and has over 2000 species of mountain and alpine plants from many different lands. It offers special opportunities for various lines of botanical research.—*Geo. D. Fuller.*

4143. Church, A. H. **Introduction to the plant life of the Oxford district. 1. General.** Bot. Mem. [Oxford] 13. *103 p., 15 fig.* 1922.—An outline of climate, geology, and physiographic development of the area is followed by one of the primary woodland and its derivatives. *Quercus pedunculata* is the predominate tree with *Alnus, Betula, Corylus, Carpinus, Fagus, Salix* and *Populus* as subordinates. Types of the undergrowth include *Crataegus, Pyrus, Prunus, Ilex* and *Viburnum.* Swamp vegetation is abundant and is given special attention. The author believes that obligate aquatic vegetation has evolved from an arboreal ancestry. The influence of man upon the vegetation is carefully noted and the secondary or artificial formations examined. These include modified forest, coppice, hedgerows, grassland and pasture. All are carefully described and some attention is given to weeds and other invaders. The bibliography contains many citations dating back to the 16th century.—*Geo. D. Fuller.*

4144. Domin, K. **The origin of the open forest formation.** Vestnik [Rept. 1st Congress Czechoslovak Botanists in Prague] 1921: 92–96. 1923.—The author presents evidence in support of his hypothesis that the open forest and more particularly the grassy Eucalyptus type of Australia is a secondary formation due to the action of regular bush fires and grazing.—*Geo. D. Fuller.*

4145. Freeman, Geo. F. **Studies in evaporation and transpiration.** Bot. Gaz. 70: 190–210. *5 fig.* 1920.—Evaporation from a porous cup atmometer inclosed in a glass cylinder through which a current of air was passed was investigated. Transpiration from alfalfa and other plants under similar conditions showed that changes in the dew-point of the air profoundly changes the evaporating efficiency of the leaf surfaces, probably because of stomatal movements. Different races of alfalfa exhibit measureable differences in the rate of evaporation per unit leaf area and such differences may be of economic importance in semiarid regions.—*Geo. D. Fuller.*

4146. Fuller, Geo. D. **Ecological concepts and nomenclature.** Bot. Gaz. 71: 403–405. 1921.—This is a critical review of the recent contributions of Tansley, Pavillard, Romell and others to ecological classification.—*Geo. D. Fuller.*

4147. FULLER, GEO. D. **Ecological terms and concepts.** Bot. Gaz. 69: 183–185. 1920.—This is a critical review of 7 recent contributions to the nomenclature of ecology, including the work of Pavillard, Du Rietz, and Gams. Some of the terms are approved as giving clearer and more definite expression of concepts already appreciated by ecologists, but the scheme of Gams for an entirely new system of classification units is characterized as too revolutionary.—*Geo. D. Fuller.*

4148. KOŘÍNEK, J. **Intoxication par les microbes saprophytes chez les végétaux. [Plant intoxication by saprophytic bacteria.]** Preslia [Rept. Czechoslovak Bot. Soc. Prague] 2: 59–66. 1923.—Using *Vicia faba* grown under various conditions and *Bacterium prodigiosum* as the micro-organism no response was obtained from growing plants in liquid media in which the bacterium was abundant nor by injecting it into roots or cotyledons. No differences were found between the inoculated plants and the controls.—*Geo. D. Fuller.*

4149. MOLLIARD, M. [Rev. of: SCHRÖTER, C. **Das Pflanzenleben der Alpen. Eine Schilderung der Hochgebirgsflora. (The plant life of the Alps. A description of the mountain flora.)** *2nd ed., 336 p., 5 pl., 125 fig.* Alb. Rapstein: Zurich, 1923 [(see Bot. Absts. 13, Entry 4155).] Rev. Gén. Bot. 35: 271. 1923.

4150. PAVILLARD, J. **Espèces et associations; essai phytosociologique. [Species and associations; a phytosociological essay.]** *34 p.* The author: Montpellier, 1920.—The species and the association are regarded as the 2 fundamental units of geobotany. Each unit may be considered from the floristic, the genetic, and the ecological point of view and hence there result 6 subdivisions of the science: (1) floristic geobotany, (2) genetic geobotany, (3) ecologic geobotany, (4) floristic phytosociology, (5) genetic phytosociology, (6) ecologic phytosociology. The content of these subdivisions is discussed.—*Geo. D. Fuller.*

4151. PAVILLARD, J. **L'association végétale: Unité phytosociologique. [The plant association: A phytosociological unit.]** *12 p.* The author: Montpellier, 1921.—Emphasis is given to the association as the fundamental unit of plant sociology. The scope of phytosociology and its relation to other branches of ecological science are discussed.—*Geo. D. Fuller.*

4152. PEARSALL, W. H. **The statistical analysis of vegetation: A criticism of the concepts and methods of the Upsala school.** Jour. Ecology 12: 135–139. 1924.—The school, as indicated by the contributions of Du Rietz, Arrhenius and others, is outlined as holding: (1) the "association" is a plant community with definite constants and definite physiognomy; (2) the "minimal area" of an association is the smallest area in which the association attains its definite number of constant species; (3) the "constants" are those species which occur in over 90% of the areas examined.—The methods of determining the constants are examined and found to be workable and rather rapid, the subjective element being reduced to a minimum. The originators have analyzed thousands of quadrats, chiefly of moors, heath forests and lichen communities but do not seem to have investigated plant associations with only 1 dominant species. In such a case it would seem that the number of constant species would increase gradually as the quadrat area increased, hence the constancy-minimal area concept appears to depend on the nature of the particular association examined. Pearsall concludes: "To sum up, although we are prepared to agree that the plant association is characterized by definite constant species, we do not think that the methods which have been devised to determine the more important of these constants are necessarily of general application. It seems indisputable that many more species could be constant if relatively large areas were taken as the basis of comparison. Under such circumstances there can be no definite number of constant species and hence no minimal area in which they occur. Nevertheless, these attempts to arrive inductively at a method of vegetation analysis are worthy of great praise, and it is to be hoped that they may mark the birth of a new era in plant sociology."—*Geo. D. Fuller.*

4153. RICHARD, J., M. OXNER, ET L. SIRVENT. **Observations méthodiques de température et de salinité a diverses profondeurs au large de Monaco, de décembre 1907 a mars 1914. [Systematic observations of temperature and salinity at various depths in the vicinity of Monaco from December 1907 to March 1914.]** Bull. Inst. Oceanogr. Monaco 436. *6 p.* 1924.

4154. RÜBEL, EDWARD. **Geobotanische Untersuchungs Methoden. [Research methods in geobotany.]** *xii + 290 p., 1 pl., 69 fig.* Gebrüder Borntraeger: Berlin, 1922.—This is a very complete discussion of modern methods applied to the solutions of the problems in all branches

of ecology and plant geography. Particular attention is given to instrumental, quantitative and statistical investigations and a large number of appliances such as thermographs, photometers, radiometers, and atmometers are figured and described. The various classes of factors are discussed in detail under such headings as climatic, edaphic, biotic, and orographic. Their relationships and interactions are also considered. The concepts in use to express the sociological relations of the vegetational units are considered and the methods of their application discussed. Here are included such concepts as abundance, dominance, distribution, sociability, periodicity, constancy, and fidelity. The use of the quadrat and other statistical methods are described and compared. Life-forms, zones and their limitations, maps, their making and coloring, and many minor topics related to field studies are carefully considered.—*Geo. D. Fuller.*

4155. Schröter, Carl. **Das Pflanzenleben der Alpen. Eine Schilderung der Hochgebirgsflora. [The plant life of the Alps. A description of the mountain flora.]** *2nd ed.*, Pt. 1. *336 p., 5 pl., 125 fig.* Alb. Rapstein: Zurich, 1923.—The author's classic work has been so thoroughly revised and enlarged as to form an essentially new treatise on alpine plant life. The book is to be completed in 2 other similar parts. The author first treats of the relationship of the alpine flora to other vegetation, and of its division into altitudinal belts. Then he analyzes the natural factors, both of the climate and of the soil, that influence mountain vegetation, considers the plant habitats, and classifies the plant associations found in the Swiss Alps. A part deals with the chief representative woody plants. Beginning with *Pinus montana* the principal species are described with extensive citations of literature, and careful considerations of various growth forms, light requirements, and geographic distribution. This portion of the work closes with a description of alpine meadow flora. [See also Bot. Absts. 13, Entry 4149.]—*John W. Harshberger.*

4156. Thoday, D. **Carbon assimilation.** South African Jour. Sci. **19**: 52–63. 1922.—After a review of the contributions of Blackman, Willstätter and others to our knowledge of chlorophyll and photosynthesis, the plants in the more open types of vegetation and the relative light demanders of forest fringes are compared with the vegetation typical of forests. Here the depth of the green color of the forest trees and the lighter color of the light-demanding plants is striking. The dark green leaves characteristic of the evergreen forest vegetation have narrow palisade cells, whereas the lighter colored leaves of the Protoeaceae, for example, have wide palisade cells.—*E. P. Phillips.*

VEGETATION

4157. Bosworth, T. O. **Geology of the Tertiary and Quaternary periods in the northwest part of Peru.** *xxii + 434 p., 150 fig., maps.* Macmillan Co.: London, 1922.—This contains a short chapter (p. 312–317, 6 fig.) on the vegetation of the Desert of Tumbes in the north-west. Species of *Cereus, Opuntia, Prosopis,* and *Tillandsia* are illustrated by photographs.—*Geo. D. Fuller.*

4158. Clayberg, H. D. **Upland societies of Petoskey-Walloon Lake region.** Bot. Gaz. **69**: 28–53. *1 fig.* 1920.—The author describes the forest vegetation of a region on the lower peninsula of Michigan. The climax forest association is composed of *Acer saccharum* 70–90%, *Fagus grandifolia* 5–30%, *Tsuga canadensis* 5–25%, and a small proportion of secondary trees. The seriation, the stratification, the environment, and the floristics of the climax forest and of the successional stages leading up to it are discussed.—*Geo. D. Fuller.*

4159. Gadeceau, E. **Le lac de Grand Lieu. [Lake Grand Lieu.]** La Nature **1924**: 65–69. *9 fig.* 1924.—This is a shallow lake near Nantes, France, with an area of some 1250 square km. The zonation of vegetation is described and its succession traced.—*Geo. D. Fuller.*

4160. MacCaughey, Vaughan. **Hawaii's tapestry forests.** Bot. Gaz. **70**: 137–147. *6 fig.* 1920.—This name is applied to montane rain forests on mountains sides with slopes of 50–60°, at altitudes of 800–4,500 feet and with an annual precipitation of 100–400 inches. The steepness and wetness of these slopes prevent grazing. The vegetation consists of dwarfed trees, deformed by the wind and possessing foliage of small, simple, oval, glossy leaves whose shades of green give a rich mottled tapestry effect. Prop roots, lianas, and thick layers of epiphytic lichens, mosses, ferns, and liverworts are abundant. Landslides are common

although one of the economic aspects of such vegetation is the conservation of soil and water.—*Geo. D. Fuller.*

4161. Schmieder, Oskar. **Argentinien.** [Argentina.] Geogr. Zeitschr. 28: 232–353. *7 map.* 1922.—This account of the geography of Argentina contains a map and brief descriptions of the plant formations. They include the subtropical forest of the north passing through a savanna to the grasslands of the center and the scrub-steppe of the west and south. The mountains of the west have a xerophytic Andean vegetation in the north and a Patagonian forest, with beech the dominant tree, in the south.—*Geo. D. Fuller.*

4162. Steffen, H. **Die Quellmoore des Kreises Berent in Wpr.** [The spring moors of Berent in west Prussia.] Bot. Archiv 2: 229–235. 1922.—Brief descriptions with enumeration of species are given of the following existing plant associations: Hypneto-Caricetum, Equisetetum palustris, Scirpetum silvatici, Magno-Caricetum, and High Shrub.—*William Seifriz.*

4163. Weberbauer, August. **Die Vegetationskarte der peruanischen Anden zwischen 5° und 17° S.** [A vegetation map of the Peruvian Andes between 5° and 17° S. Lat.] Petermanns Geogr. Mitteil. 68: 89–91, 120–122. *Map.* 1922.—Twenty-five formations or association types are distinguished, described briefly, and mapped in such a manner that the result is easily read. Practically all Peru is covered and the vegetation ranges from rain forest on the east through various types of scrub to an extensive high Andean semi-desert characterized by a scanty vegetation of polster and rosette plants. Descending the western slopes scrub and savannas merge into a coastal desert.—*Geo. D. Fuller.*

FLORISTICS

4164. Braun-Blanquet, Josias. **L'origine et le développement des flores dans le Massif Central de France.** [The origin and development of the flora of the Central Plateau of France.] *282 p., 6 pl., 13 fig.* Leon Lhomme: Paris, 1923.—In this study the geographical and paleobotanical sources of the elements of the flora are considered. The 3 principal elements are: (1) The Eurosiberian-Boreoamerican, appearing in the Oligocene, and dominating the region. It is divided into the autochtonic Medo-European sub-element found frequently in the Tertiary deposits; the Atlantic sub-element coming in during humid and mild interglacial periods and furnishing some endemic plants and increasing from east to west; and the Boreo-Arctic sub-element, dating from the glacial periods and preserved in the boggy parts of the plateau. (2) The Mediterranean element of Tertiary origin, most abundant in the south and probably still moving northward. In the south Cevennes are 6 endemics evidently derived from types widely spread throughout the Mediterranean region during the late Tertiary. (3) Aralo-Caspian element represented by a very few species which are apparently the relics of a Tertiary invasion.—Endemics are more abundant than in similar areas elsewhere in Europe and are considered in detail. There is also a detailed study of orophytes, a group that includes the plants characteristic of the alpine and sub-alpine regions. There are no traces of an ancient alpine flora, the alpine species being evidently for the most part relics of the glacial periods. The vast majority of the orophytes are common to the Alps and Pyrenees.—Phytogeographically the region is to be referred to the Armorico-aquitanian section of the Atlantic Domain, and is divided by the author into various sub-sections and districts. Extensive well annotated lists of species and a bibliography of over 350 citations complete the volume.—*Geo. D. Fuller.*

4165. Cockayne, L. **The distribution of the flora and vegetation of New Zealand.** Cawthorne Lecture 1919. *27 p., 10 fig.* Stiles & Co.: Nelson, New Zealand, 1921.—This is a very complete synopsis of the native vegetation of New Zealand describing the principal floristic and ecological divisions and attempting to give the causes that have produced this distribution of plants. The coastal, the lowland, and the high mountain floras are regarded as the 3 major divisions and these are in turn divided into 15 botanical districts which are described and mapped. Among the causes of plant distribution discussed are the influences exerted by Cooke Strait, by latitude, by the Southern Alps and coastal mountains, by winds, by altitude, and by edaphic factors. Examples of continuous and discontinuous distribution are cited and examined.—*Geo. D. Fuller.*

4166. Hauman, Lucien. **Notes sur les espèces Argentine des generes Azorella et Bolax. [Notes on the Argentine species of Azorella and Bolax.]** Rev. Soc. Argentina Ciens. Nat. 4: 468–500. *7 fig.* 1919.—These are two closely related umbelliferous genera noted for their compact cushion habit. They occur in the high Andes, in Patagonia, and in the subarctic regions. An annotated list of 24 species occurring in Argentina is given, and *Azorella yareta* is described as new. The celebrated "balsam bogs" of Terra del Fuego have *Bolax gumifera* as their characteristic species.—*Geo. D. Fuller.*

4167. Kenoyer, L. A. **Plant life of British India.** Sci. Monthly 18: 48–65. *14 fig.* 1924.—With rainfall varying from 3 to 460 inches and with temperature from 120°F. to far below zero there is great diversity of vegetation. India has 17,000 species of flowering plants as compared with some 4,000 in the northeastern U. S. A. and Canada, an area ½ as large. All the leading types of vegetation except grassland are found. The monsoon forest is the leading type grading into thorn forest, scrub, and desert in the west.—Compositae, Cyperaceae, Graminae, Rosaceae, and Leguminosae are the 5 leading families in northeast U. S. A., while Orchidaceae, Leguminosae, Graminae, Rubiaceae, and Euphorbiaceae lead in British India. The orchids are most numerous in the humid eastern Himalayan region.—In the Himalayas in a zone 50–75 miles wide, the vegetation of the earth from the poles to the equator is condensed. We pass through the tropical monsoon forest, a warm temperate semi-arid pine forest allied to our [U. S. A.] southern long-leaved pine, three distinct oak forest zones, a cold temperate deciduous forest of maples, elms, alders, poplars and the like, a forest of cedar, pine, spruce and cypress allied to our evergreen forest, a subalpine forest of white birch and fir, an alpine shrub zone, alpine meadows, and at last perpetual snow.—A banyan tree (*Ficus benghalensis*) in the Calcutta Botanical gardens has about 500 prop roots and covers 2 acres. The largest liana (*Bauhinia Vahlii*), the elephant creeper, may cover ¼ acre of forest. On *Pinus excelsa* is found *Arceuthobium minutissimum*, said to be the smallest dicotyledon.—*L. Pace.*

4168. Knoche, Herman. **Etude phytogéographique sur les Iles Baléares. [Phytogeographic study of the Balearic Isles.]** *170 p., 14 pl.* Univ. Montpellier: Montpellier, 1923. —The volume contains a detailed account of the geologic history of the Islands and of the Mediterranean region, in general postulating the existence of a continent in the Eocene stretching from New Zealand through America to the Balearics. Other land connections are traced at subsequent times, including the lost Atlantis. Many of the typical sclerophylls of the Mediterranean such as *Myrtus*, *Pistacia*, *Rhamnus*, *Buxus*, and *Laurus* are referred to an Eocene origin, explaining some of the affinities to the New Zealand, Chili, Mexico, California and the Mediterranean floras. The flora is further analyzed and relationships shown in tables and maps.—There are 1,280 species of vascular plants, the families making the most conspicuous showing in number of individuals being the Compositeae with 141 species, the Cistaceae with 14 species, and the Liliaceae with 9 species. The cryptogamic flora is also sketched. The vascular endemics number 61 species, and relic, recent, Tyrrhenian, and Mediterranean groups are recognized.—The principal plant association of the Balearics is an open scrub or "garique" in which the dominant species are *Pistacia lenticus*, *Cistus albidus*, *C. monspeliensis*, *Rosmarinus officinalis*, and *Olea silvestris*. The bibliography includes 188 citations.—*Geo. D. Fuller.*

4169. Marie-Victorin, Fr. **Esquisse systématique et écologique de la flore dendrologique d'une portion de la rive sud du Saint-Laurent, aux environs de Longueil, P.Q. [Systematic and ecologic sketch of the tree flora of the south shore of the St. Lawrence in the vicinity of Longueil, Quebec.]** Rev. Trimest. Canadienne 8: 1–33. 1922.—A secondary forest of *Quercus borealis*, *Acer rubrum*, *Ulmus americana*, and *Fraxinus* spp. together with species of *Hicoria*, *Populus*, and *Betula* is discussed. The natural history of the species, bits of botanical folk lore, and ecological considerations are combined in an interesting manner. The absence of conifers, the pioneer character of *Betula populifolia*, the southern and western elements here at their extreme limits, and man's influence in promoting the increasing abundance of *Crataegus* spp. are among the topics considered.—*Geo. D. Fuller.*

4170. Over, Wm. H. **Trees and shrubs of South Dakota.** Bull. Univ. South Dakota Ser. 23., No. 2. *13 p.* 1923.—This is an annotated list of the woody plants of the State.—*Geo. D. Fuller.*

4171. St. John, Harold. **A botanical exploration of the north shore of the Gulf of St. Lawrence including an annotated list of the species of vascular plants.** Canada Dept. Mines Mem. 126. iii + *130 p., 4 pl., 2 map.* 1922.—The shore line from 57°–67°W. includes both limestone and granitic areas. Notes are given on geology, physiography and climate together with an historical review of botanical explorations. The plants are grouped as halophytes, oxalophytes, calcicoles and indifferents with special notes on the soil preferences of various plants. The native vascular flora includes 582 species. There is a discussion of the relation between the chemical nature of the soil and the distribution of plants, the author holding strongly to the chemical theory and giving a bibliography of 97 titles on the subject. The following new species and varieties are recognized and described: *Equisetum palustre* L. var. *nigridens*, *Alopecurus aristulatus* Michx. var. *Merriami* (Beal) n. comb., *Poa alpina* L. var. *Bivonae* (Parl) n. comb., *Salix vestita* Pursh var. *psilophylla* Fernald & St. John, *Androsace septentrionalis* L. var. *glandulosa* (Wooten & Standley) n. comb., *A. septentrionalis* L. var. *robusta*, *A. occidentalis* Pursh var. *simplex* (Rydb.) n. comb., *A. occidentalis* Pursh var. *arizonica* (Gray) n. comb., *Antennaria glabrifolia* Fernald, *A. spathulata* Fernald var. *continentis* Fernald & St. John.—*Geo. D. Fuller.*

4172. Schustler, Frantisek. **The dealpines, their nature and importance.** Vestnik [Rept. 1st Congress Czechslovak Botanists in Prague] 1921: 57–58. 1923.—The author distinguished 2 classes of plants found both in alpine and lowland habitats: (1) plants originating in the lowlands and migrating to favorable adjacent subalpine or alpine habitats; (2) truly alpine plants that have migrated from the mountains during periods of cooler climate and, retreating, leave behind them stranded glacial relics on rather remote lowlands. The former types are known as "prealpines" and such species are *Coronilla vaginata* and *Polygala chamaecistus* are cited as examples. For the latter class the designation of "dealpines" is suggested and *Aster alpinus*, *Primula auricula*, and *Draba aizoon* are among the examples cited.—*Geo. D. Fuller.*

4173. Taylor, Arvilla M. **Ecological succession of mosses.** Bot. Gaz. 69: 449–491. *2 fig.* 1920.—The development of mosses in the successional stages of the vegetation of the Chicago (Illinois) region was studied and the moss communities related to the different environmental factors. They are most abundant in the successions on sand and here reach their best development in the pine association. In swamps and bogs they have their greatest dominance in the swamp or bog forest association. The moss succession on flood plains is unimportant owing to the constant deposition, while on rock habitats they are important pioneer plants and continue abundant far into the forest associations. The ecological and economic importance of mosses in soil formation, in moisture conservation, and in the preservation of clay and other soil surfaces from destruction by erosion is emphasized.—*Geo. D. Fuller.*

APPLIED ECOLOGY

4174. Carr, Elmer G. **The honey resources of New Jersey.** Amer. Bee Jour. 63: 595–597. *Fig. 1–3.* 1923.—The honey zones of the state are: (1) the northern, dependent on clover and sumac for summer and on buckwheat, goldenrod, and aster for autumn flow; (2) the central with *Polygonum pennsylvanicum*, goldenrod, and aster; and (3) a southern with alsike clover and *Clethera alnifolia*. Along the Delaware River *Bidens laevis* furnishes a golden yellow honey.—*J. H. Lovell.*

4175. Carvallo, Jose Rivero. **Manual de apicultura.** *88 p., 55 fig.* Puebla, Mexico, 1923.—In chapter 22 the plants in Mexico valuable for nectar and pollen are enumerated according to their vernacular names in Spanish, but without descriptions.—*J. H. Lovell.*

4176. Dachnowski, A. P. **Correlation work in land-peat problems.** Bot. Gaz. 70: 453–458. 1920.—This paper places emphasis on the correlation that exists between the botanical composition of peat material and its physical, chemical and economic nature. A plea is made for a more extensive and careful study of peat deposits and for a comparison of American and European deposits with a view to better utilization of such resources.—*Geo. D. Fuller.*

4177. Floyd, L. T. **A glimpse of Manitoba.** Amer. Bee Jour. 63: 496–499. *Fig. 1–4.* 1923.—The physical features, soils, climate and rainfall are briefly described. The honey crop comes mainly from wild flowers, as asters, goldenrods, wild sunflowers, raspberry, fire-

weed, snowberry (*Symphoricarpos orbiculatus* and *S. racemosus*), and basswood. Cultivated clovers and white sweet clover are important. The northern and northeastern portions are largely covered with spruce and pine forest. Southwest of this region there is a mixed woods of poplar, birch, spruce, tamarac and willows. The southwest corner is largely open prairie covered with tall grasses, sedges, and willow-dogwood thickets. There is also an area of poplar trees. The extreme southwestern portion is treeless prairie on which legumes and composite perennials are very abundant.—*J. H. Lovell.*

4178. Foster, W. G. **Honey sources of Kootenay.** Gleanings in Bee Culture **51**: 735. 1923.—*Epilobium angustifolium* and *Asclepias syriaca* are the most important honey plants.—*J. H. Lovell.*

4179. Lovell, John H. **The relation of the honey-bee to the odors of flowers.** Amer. Bee Jour. 63: 501–502. *Fig. 1–2.* 1923.—The allurement of the odors for bees is discussed.—*J. H. Lovell.*

4180. Merrill, J. H. **Response to the nectar stimulus.** Amer. Bee Jour. **63**: 607. *Fig. 1.* 1923.—The amount of honey stored each day by 5 colonies of bees during June and July is graphically illustrated.—*J. H. Lovell.*

4181. Pellett, Frank C. **With Texas beekeepers.** Amer. Bee Jour. **63**: 550–552. *Fig. 1–4.* 1923.—Yellow-tops (*Ximenesia encelioides*), a little known honey plant, is common over a large area and yields a dark honey with a strong flavor.—*J. H. Lovell.*

4182. Phillips, E. F. **Improving nectar resources. Why beekeepers in the United States do not cultivate nectar-bearing flowers.** Gleanings in Bee Culture **51**: 726–728. 1923. —Extensive tests have been made in the U. S. A. of the cultivation of nectariferous plants, as is done in parts of Europe, but it is found impracticable. Since most beekeepers fail to have their colonies strong enough to gather all the nectar now available, the cultivation of honey plants is a waste of effort. The possibilities of expansion of beekeeping with the present nectar resources are summarized. [Published also as: **Amèlioration des ressources du nectar aux États-Unis.** Compt. Rend. Congrès Internat. d'Apiculture **6**: 40–42. 1922[1923]. Translated by Ph. J. Baldensperger.]—*J. H. Lovell.*

4183. Shafer, Geo. D. **Honey-dew produced by an insect gall.** Amer. Bee Jour. **63**: 56. *Fig. 1.* 1923.—In California large quantities of a sweet liquid are excreted by numerous galls, caused by *Dicholcaspis eldoradensis*, on the twigs of *Quercus lobata.* Honey-bees in great numbers gather it.—*J. H. Lovell.*

4184. Shaw, F. F. **Some East Texas honey plants.** Beekeepers' Item **7**: 294. 1923.—At Lovelady in eastern Texas *Xanthoxylon Clava-Hercules, Berchemia scandens, Tilia americana, Cissus incisa,* and *Gossypium herbaceum* are the principal honey plants with seasons extending from April 1 to August 4.—*J. H. Lovell.*

4185. Titcomb, John W. **Aquatic plants in pond culture.** U. S. Bur. Fish. Document 948. *24 p., 32 fig.* 1923.—The occurrence of these plants in the pond-culture stations of the Bureau of Fisheries is discussed and the principal species illustrated. The importance of plant life in fish culture is stated and the value of a particular species shown to depend chiefly upon the amount of growth it attains, which should be neither too scanty nor too abundant. Methods of checking undesirable growth are given.—*Geo. D. Fuller.*

4186. Wilder, J. J. **The wonder honey plant.** Dixie Beekeeper **5**[7]: 3–6. *Fig. 1–5.* 1923.—This plant, *Pentstemon laeviagatus* near Branford, Florida, yielded 12 barrels of honey to a small apiary.—*J. H. Lovell.*

FORESTRY

W. N. Sparhawk, *Editor*

(See also in this issue Entries 4077, 4117, 4122, 4140, 4144, 4155, 4158, 4160, 4161, 4163, 4165, 4167, 4168, 4169, 4170, 4177, 4302, 4348, 4351, 4477)

4187. Anonymous. **Arbor day.** U. S. Dept. Agric. Dept. Circ. 265. *14 p.* 1923.—The meaning, origin, and observance of Arbor day (with dates for states) the care of trees, planting, woods and water supply, memorial trees, and related topics are discussed.—*L. R. Hesler.*

4188. Anonymous. **Forest Resources of Chile.** Jour. Roy. Soc. Arts **72**: 169–170. 1924.

4189. Anonymous. **Forêt de Soignes et champ d'experience de Belle-Etoile.** [Forest of Soignes and experimental area of Belle-Etoile.] Bull. Trimest. Soc. Forest. Franche-Comté et Provinces de l'Est 15: 98–105. 1923.—Details of management and silviculture with figures of stand, trees reserved, growth and yield for typical areas of high forest of different ages are given. In a 190-year stand of oak and beech, periodic annual growth for the 10 years 1909–1919 was 6.4 cubic m. per hectare. A 172-year stand of beech showed a periodic annual growth of 12.241 cubic m. per hectare. On the experimental area, oak, ash, maple, and beech have been planted in cultivated rows with white alder or willow in the alternate uncultivated rows, as shelter. The shelter has proved very beneficial for oak, less so for ash, and harmful for maple. Beech does well under shelter for 10–12 years. Experiments have also been made in mixing 5 species of pine in plantations,—*Pinus strobus, P. sylvestris, P. laricio, P. Banksiana,* and *P. rigida.* Trials were made by alternating the species in the rows, by alternating rows each of the same species, by groups of 6–12 trees of all 5 species, and by groups of 20–25 trees of the same species. *P. rigida* and *P. laricio* have almost disappeared. The other 3 species show 14–27% survival. The groups of 20–25 trees of the same species seem to give the best results, particularly in the case of *P. sylvestris.*—*J. Kittredge, Jr.*

4190. Akerman, Alfred. **The white cedar of the Dismal Swamp.** Virginia Geol. Comm. Office State Forester Publ. 30. *21 p., 8 pl.* 1923.—This bulletin presents the results of a study of southern white cedar (*Chamaecyparis thyoides*) in the Dismal Swamp of southeastern Virginia and northeastern North Carolina. The properties and uses of the wood, form, growth, rotation, yield, reproduction, protection from fire, and possible uses for cedar swamp lands are discussed in non-technical language. Volume tables for estimating standing timber are appended.—*C. F. Korstian.*

4191. Beutl, E. **Kulturumwandlung, Aufforstung und Torfstreuverwendung als Möglichkeiten zur Hebung der Urproduktion.** [Cultural modifications, afforestation and the utilization of peat as means of increasing production.] Wiener Landw. Zeitg. 73: 349–350. 1923.—This is an impartial discussion of the merits of afforestation as compared with the development of forest meadows for grazing, and the conclusion is drawn that for certain parts of Austria, particularly the foothills of the alpine regions, the meadow will be more profitable. The wider use of "turf litter" (sphagnum) as a bedding material, and also as a soil emollient is recommended.—*F. Weiss.*

4192. Cunliffe, N., and G. B. Ryle. **The conifer spinning mite on Sitka spruce. (Oligonychus (Paratetranychus) ununguis Jacobi.)** Quart. Jour. Forestry 17: 359–362. *1 pl., 1 fig.* 1923.—The insect, which is closely related to the common "red spider," is described and its life history discussed briefly. It attacks Sitka, white, Engelmann, and Norway spruces, larch, and pine, and has attacked *Picea Remonti* in Holland. It is ordinarily considered a nursery pest, but in Bagley Wood has been found only on Sitka spruce in plantations more than 2 years old. Trees about 4 years old were most severely attacked. It feeds on the sap of the needles, causing a yellowish brown tinge particularly at their bases. In nurseries, it has been controlled by the use of soap-emulsion, quassia-nicotine emulsion, lime-sulphur sprays, and carbolineum, the last being used on larch during the winter.—*C. R. Tillotson.*

4193. Demorlaine, J. **Forêt de Soignes.** [Forest of Soignes.] Bull. Trimest. Soc. Forest. Franche-Comté et Provinces de l'Est 15: 79–86. 1923.—The history of the forest is traced briefly from 1545. It now contains 4,120 hectares near Brussels at an altitude of about 100 m.; 3500 hectares are in hardwood, 275 in softwood high forest, and 345 in "standards over coppice." The predominating species are beech, oak, and Scotch pine. The regulation and silvicultural management are outlined. Both are influenced by aesthetic considerations since the forest serves as a park for the city. Light cuttings at frequent intervals are the rule. Details of several characteristic stands are given including statistics of species, age, height, volume, and number of stems per hectare. "Standards over coppice" as used by the Belgian foresters means a high forest of standards which has been underplanted as a cultural measure for the standards without thought of harvesting the understory for its own value.—*J. Kittredge, Jr.*

4194. E. [Rev. of: Zimmer, G. **Die Entwicklung des Holzhandels und Holzverkehrs im Grossherzogtum Hessen. [Timber trade in Hesse.]** H. Robert: Grünberg, 1923.] Forstwiss. Centralbl. **45:** 479–480. 1923.—Besides fairly accurate figures on timber production, imports, and exports, the book contains valuable historical data concerning the timber trade and principal markets.—*W. N. Sparhawk.*

4195. Fabricius. [Rev. of: Kienitz, M. **Deutsche Harznutzung. III. Die Kiefernharznutzung in Deutschland. (Pine resin industry in Germany.)** *12 p., 2 diagr.* Deutsche Harzgesellschaft: Berlin, 1923.] Forstwiss. Centralbl. **45:** 353–354. 1923.—This booklet describes the pine resin industry since 1815, and devotes especial attention to refuting the belief that good forestry and the resin industry are incompatible. Kienitz's assertion that growth of bled trees is actually stimulated is surprising, and shall be confirmed by comprehensive investigations. Perhaps the principal reason why bleeding the trees does not interfere with good forestry practice is the fact that they are not bled until just before cutting.—*W. N. Sparhawk.*

4196. Fabricius. [Rev. of: Künkele. **Die Bodenpflege auf Buntsandstein, insbesondere im Pfälzerwald. (Care of the soil in red sandstone districts, especially in the forests of the Palatinate.)** *31 p.* Publ. by author: Munich. 1923 (?).] Forstwiss. Centralbl. **45:** 430–433. 1923.

4197. Fabricius. [Rev. of: Porsch, Otto. **Schlüssel zum Bestimmen der für Österreich forstlich wichtigen Laubhölzer nach den Wintermerkmalen. (Key for identification of important Austrian broad-leaved trees in winter condition.)** *10 p.* Carl Gerold's Sohn: Vienna, 1923.] Forstwiss. Centralbl. **45:** 473. 1923.—Seventy species are covered.—*W. N. Sparhawk.*

4198. Fabricius. [Rev. of: Romell, Lars-Gunnar. **Hänglavar och tillväxt hos norrländsk gran. (Beardmoss and increment of spruce in Norrland.)** Meddel. Statens Skogsförsöksanst. **19:** 405–438. *12 fig.* 1923.] Forstwiss. Centralbl. **45:** 354–355. 1922.—This investigation has not settled the question whether the moss (*Alectoria sarmentosa* Ach. and *A. Fremontii* Tuckerm.) causes growth stagnation or thrives on trees because their growth is slow, although the author inclines to the latter view.—*W. N. Sparhawk.*

4199. Fabricius. [Rev. of: Stehli, Georg (editor). **Feinde der Land und Forstwirtschaft. Ihre Biologie und Bekämpfung. (Enemies of agriculture and forestry—their biology and control.)** Vol. 1, published under auspices of Biologische Reichsanstalt für Land- und Forstwirtschaft, by Kosmos: Stuttgart, 1923 (?).] Forstwiss. Centralbl. **45:** 475–476. 1923.—This volume takes up in a popular way 16 garden, orchard, and forest insects. Some inaccuracies are noted in the discussion of forest insects.—*W. N. Sparhawk.*

4200. Fabricius. [Rev. of: Stoklasa, Julius. **Die Beschädigung der Vegetation durch Rauchgase und Fabrikexhalatationen. (Injury to vegetation by smoke and fumes.)** *xxiv + 487 p., 21 pl., 36 fig.* Urban & Schwarzenberg: Berlin and Vienna, 1923 (see Bot. Absts. 13, Entries 2842, 3110).] Forstwiss. Centralbl. **45:** 428–430. 1923.—The book deals almost exclusively with the effect of SO_2, SO_3, H_2SO_3, H_2SO_4, and Se gases on plant cells, and on the chemistry and micro-flora of the soil. The subject should be better understood by foresters, because of the less evident injuries, such as hindrance to growth, reduction in yield of fertile seed, and formation of raw humus, often extending to a considerable distance from the source of the gases.—*W. N. Sparhawk.*

4201. Gill, Walter. **Annual progress report upon state forest administration in South Australia for the year 1922–23.** Ann. Progress Rept. Woods and Forests Dept. South Australia. *12 p., 12 fig., 4 map.* 1923.—General features of the year's work are described. About 866 acres were planted, chiefly to *Pinus insignis* and eucalypts.—*C. F. Korstian.*

4202. Green, F. J. **How to combat injurious insects.** Quart. Jour. Forestry **17:** 208–224. 1923.—Methods of combating insects injurious to forest trees in the nursery or in woodlands are discussed.—*C. R. Tillotson.*

4203. Grotlisch, V. E. **Turpentine and rosin.** U. S. Dept. Agric. Dept. Circ. 258. *13 p.* 1923.—Statistics of world production and consumption, U.S.A. production and exports and the distribution of world trade in turpentine and rosin are presented.—*L. R. Hesler.*

4204. Hartmann. **Grundlagen für die Analysierung von Bestandesbodenfloren im Dienste bestandesbiologischer Forschungen. [Principles of analysis of the flora of the forest floor as**

an aid to study of the biology of the stand.] Forstwiss. Centralbl. **45**: 340–351, 385–394. *2 fig.* 1923.—Quantitative and qualitative analyses of the flora of the forest floor are exceedingly valuable in studying the effect of various ecological factors involved in the development and silvicultural treatment of forest stands. Methods of analysis developed by Raunkiaer, Lagerberg, and others are discussed. The author considers meter quadrats the most satisfactory for use with ordinary sample plots of 0.05–0.10 hectare. To give reasonably accurate and comparable pictures of the vegetation, 15–40 quadrats should be analyzed, the number depending on local conditions.—*W. N. Sparhawk.*

4205. Hauch, L. A. **The cultivation of the oak (Quercus pedunculata) in Denmark.** Quart. Jour. Forestry **17**: 35–50, 88–97. *4 fig.* 1923.—Oak in Denmark is far less exacting than beech as to situation, soil, and climatic conditions, and unlike beech, oak woods may be established on open fields or cleared areas. It is best, however, to cultivate it under shelter of old trees held over from the previous rotation. Seed from countries south of Denmark produces shoots that are longer and thinner and much more subject to mildew than those of oaks from native seed. With proper precautions, perfectly ripe acorns which have not started to sprout can be stored from autumn to spring with little loss of germinating power. While their quality can be judged in part by external appearance, it can be determined best by cutting. In the case of ripe acorns capable of germinating, the knife passes smoothly and easily through the cotyledons, the yellowish white kernel fills the husk, and the embryo is also yellowish white; those showing a black germ are not good. Acorns are capable of germinating when the portion of the cotyledons near the embryo takes on a reddish hue toward spring and when in storage they form a radicle.—Freshly gathered or purchased acorns should be scattered in a layer 4–6 inches deep on the floor of a loft or barn and turned frequently until they do not exude moisture even if left unstirred for 24 hours. This treatment will usually last 2–3 weeks. They should then be stored, protected from drought, frost, moisture, insects and fungi. The acorns should be stirred regularly from fall until spring and the storehouse kept at an equable temperature near the freezing point. Sudden and violent changes in temperature have resulted in a decrease in germinating capacity from 85 to 33%. While frozen acorns give no outward indication of their condition, the cotyledons become spotted and finally turn black, and moisture exudes from a cut surface. Acorns stored in pits sometimes keep better than in a special storehouse, but the result is less certain. In a storehouse, acorns lose much in germinating power if kept too long; they should be sown in early spring.—Acorns should be sown so densely that the ground is quickly covered by oak plants. When sown in strips 6 inches wide and 4 feet apart, acorns of 80% germinating capacity should be spaced about 1 inch apart; this means 14–16 bushels to the acre. The seed should rarely be covered more than 1¼ inches. Dense sowing results in trees of vigorous growth and good form. Protection against deer is necessary until trees are 8–10 feet high. Plantations are ready for a light thinning at 10–15 years, the largest and best formed specimens being favored at that time. When the time comes to remove suppressed trees, they should be replaced by an underwood of beech, maple, hornbeam, hazel, or other trees.—*C. R. Tillotson.*

4206. Heinrich, Prinz. **Harzungsschaden.** [**Damage from turpentining.**] Forstwiss. Centralbl. **45**: 352–353. 1923.—Pines which were bled for resin in 1920 died following the drought of 1921, while unbled trees nearby survived.—*W. N. Sparhawk.*

4207. Holmes, J. S. **Common forest trees of North Carolina: how to know them.** *76 p.* North Carolina Geol. and Economic Surv.: Chapel Hill, 1922.—The important characteristics of 71 native trees are briefly described in non-technical language in this pocket manual.—*C. F. Korstian.*

4208. Lecomte, Henri, Paul Danguy, et A. Fauchere. **Madagascar. Les bois de la forêt d'Analamazaotra.** [**Timbers of the forest of Analamazaotra, Madagascar.**] *vii + 189 p., 56 pl., 2 fig.* A. Challamel: Paris, 1922.—Knowledge of the structure of wood is almost essential for the understanding of its qualities and possible utilization, for there is a close relationship between cellular structure and physical properties. It is even probable that substitutes for commonly used woods, such as oak and ash, can be discovered among the numerous tropical species by microscopic study more readily than by a long series of mechani-

cal tests. The present work gives the results of microscopic study of the structure of the woods whose botanical origin is known, as a fundamental step toward the efficient exploitation of the Madagascar forests. Following a description of the structure of 14 native and exotic woods well-known in France, approximately 100 Madagascar trees are described as to botanical characteristics and microscopic structure of the wood in transverse and longitudinal tangential section. Microphotographs show both sections of 64 woods magnified 30 diameters.—Very large trees are rare in this forest. The woods are predominantly grayish in color, although some are pink, red, or brown, and a few yellow. While some are light in weight, those with density of 0.8–1.0 are most numerous and many exceed 1.0.—The correlation between structure and physical properties is discussed for woods used in cabinet work, engraving, for railroad ties, tool handles, barrel staves, masts, paving, and paper pulp, and Madagascar woods are suggested as probably suitable for each of these uses.—Although there is reason to believe that Madagascar was once almost entirely forest-covered, it now has only 7,000,000 hectares of forest, or 13% of the land area. On the eastern side the natives have destroyed all but the less accessible forests or those on poor soils, by the shifting cultivation of rice. The abandoned fields ("tavy") grow up to brush and herbaceous vegetation ("savoka") and, as a result of repeated fires, finally become grassy steppes. In the west the dry climate favors the spread of fires even without the timber being cut down, but as there is little herbaceous vegetation under the denser forests, the fires eat into them only gradually. In the central districts the stands are open and fires are very destructive, so that there are only a few remnants of forest. The most destructive fires are set by stockmen to clear range for the 8,000,000 cattle on the island.—The eastern slope has a fairly uniform humid climate with mild to cool temperatures. The trees are mostly evergreen, with some deciduous species at the higher elevations, and lianas, epiphytes, mosses, and tree ferns abound. A narrow strip in the littoral zone contains such species as *Calophyllum Inophyllum*, *Hibiscus tiliaceus*, *Afzelia bijuga*, *Trachylobium verrucosum*, *Labramia Bojeri*, *Terminalia Catoppa*, *Barringtonia speciosa*, *B. apiculata*, and *Casuarina equisetifolia*, often in fairly homogeneous stands of 1 or only a few species. This zone produces good construction timber and gum copal. The forests of the lower and middle slopes have been mostly destroyed below 600 m. Higher up there remain considerable areas of forest, including that of Analamazaotra. The stands are extremely heterogeneous, with at least 200 species, few of which attain large size. They furnish firewood, railroad ties, and timber for local use, as well as some ebony and rosewood for export, and are also sources of rubber (*Mascarenhasia* and *Landolphia*), vegetable wax, tanbark, and palm fibers. The forests of the upper slopes (above 900 m.) are similar in composition and economic importance, although the trees are somewhat shorter and certain species tend to predominate, such as *Weinmannia*, *Elaeocarpus*, *Rhus*, and, locally *Podocarpus*.—The western side of the island has a warmer climate, with a dry season from April to November; hence deciduous trees predominate, and epiphytes, ferns, and mosses are less abundant. Except for scattered remnants, most of the forest has been destroyed. The 4 principal types are the forests on alluvial soils, composed of such species as *Cephalanthus*, *Protorhus*, *Eugenia*, *Ravensara*, *Canarium*, *Khaya*, and *Terminalia*, averaging 25–30 m. in height; those on lateritic soils, 15–20 m. tall and composed principally of Leguminosae (*Acacia*, *Dalbergia*, *Grewia*); those on calcareous plateaus, 15 m. tall, with such trees as *Adansonia*, *Diospyros*, and *Acacia;* and the forests on sandy slopes, mostly under 10 m. in height and characterized by *Adansonia* spp. and *Tamarindus indica*. The western forests yield precious woods and rubber. In the northwest are extensive marshes containing abundant supplies of *Raphia Ruffia*, while in the southern marshes occurs an oil palm, *Elaeis madagascariensis*.—The book is concluded with a table giving density, load at breaking point, angle of bending, and notes on ease of splitting of 40 cm. × 2 cm. × 2 cm. samples of 110 species and a short bibliography on Madagascar forests.—*W. N. Sparhawk.*

4209. Maddox, R. S. **Common forest trees of Tennessee: how to know them.** *72 p.* Tennessee Forest. Bur.: Nashville, 1922.—This pocket manual briefly describes in non-technical terms the important characteristics of 70 native trees.—*C. F. Korstian.*

4210. Maddox, R. S. **Report of the state forester from July 1, 1921 to January 1, 1923.** Tennessee Forest. Bur. Bull. *32 p.* 1923.—The act creating the Bureau of Forestry is

quoted in full. General features of the Bureau's work are described, particularly the forest fire patrol system—*C. F. Korstian.*

4211. Merrill, Fred B. **Forest fires and the boll weevil.** North Carolina Geol. and Economic Surv. Circ. 7. *4 p.* 1923.—The continued practice of some cotton growers of burning their woodlands in the mistaken belief that by so doing the boll weevil is destroyed is a serious hindrance to the prevention of forest fires.—*C. F. Korstian.*

4212. Münch und Künkele. **Die Herkunft der Pfälzischen Kiefern.** [**Origin of the pine forests of the Palatinate.**] Forstwiss. Centralbl. **45:** 401–415. 1923.—Pine now occupies 48% of the forest area of the district, while 300 years ago it occurred in only a few places. Study of old records indicates that its present predominance is due to intentional silvicultural measures. Up to about 1750 it gradually encroached on cutover hardwood lands close to pine seed-trees; after 1750 a great deal of pine seed was sown on clear-cut areas. Until 1883 local seed was chiefly used, while from 1883 to 1905 cheap seed from southern France, Hungary, and other regions was sown. It produced very inferior trees, and since 1906 local seed has been preferred. Some pine stands in southern Palatinate probably originated from seed from the Vosges of Alsace.—*W. N. Sparhawk.*

4213. Newlin, J. A., and R. P. A. Johnson. **Basic grading rules and working stresses for structural timbers.** U. S. Dept. Agric. Dept. Circ. 295. *23 p.* 1923.

4214. Nirschl. **Die Entwicklung der niederländischen Forstwirtschaft und Forstgesetzgebung.** [**Development of forestry and forest legislation in the Netherlands.**] Forstwiss. Centralbl. **45:** 315–328. 1923.—Under the theory that the State should not engage in business a law of 1848 provided for the alienation of all state lands. By the end of the century it was realized that the State should control forests and waste lands, and the law of 1899 created a forest service to administer the forests which had been left to the nation by Prince Friedrich, together with considerable areas of dune and waste. By purchase, exchange, and transfer the total area under administration on Jan. 1, 1920, was 28,718 hectares, of which 8,770 hectares was wooded. The royal family owns about 10,000 hectares of forest. Until 1900 most of the afforestation work was done by the Nederlandsche Heidmaatschappij, which from 1889 to 1919 planted 11,672 hectares. In the crown forest about 2,000 hectares were planted, and since 1900 a fairly large area of waste land in the state and communal forests has been afforested. Of the total forest area (about 250,000 hectares), the State owns 4½%, communes 14½ %, and private owners 81%, mostly in small scattered tracts.—Interest in forests was on account of their esthetic and recreational value rather than for economic reasons, until 1914, when wood imports from Germany stopped. A forest protection law proposed in 1913 to lessen damages by fire and insects did not pass, but the shortage of fuel and mine timbers led, in 1917, to an emergency law which gave the Minister of Agriculture power to forbid cutting in any forest, and to confiscate forests needed for supplying fuelwood or mine timber. After the war ended, although a comprehensive forestry law was clearly needed to maintain the gradually shrinking forest area and to stimulate production, the Government hesitated to insist upon state supervision of private forests or even to forbid forest devastation. The law of May 19, 1922, provides for an advisory forest commission; for regulations applicable to all forests to prevent damage by animals, diseases, or fire; for regulation of cutting in forests belonging to public corporations and institutions (about 14% of the forest area); and for acquisition by the State or communes of woodlands needed for the preservation of natural cenery.—*W. N. Sparhawk.*

4215. Pfeiffer. **Dauerwald.** Deutsch. Forstzeitg. **38:** 867–869. *1 fig.* 1923.—The "Dauerwald" system aims to increase yield while improving the quality of timber. The first step is to plant all openings. Early cleanings free the young trees, and thinnings are commenced as soon as the lower branches begin to die. These thinnings, repeated annually or every 3 years for conifers and every 5 years for broad-leaved trees, take out decadent, suppressed trees and also those in the dominant class which will make inferior timber and whose removal will stimulate the growth of the better trees remaining. Soil improvement is given special attention, by maintaining a cover dense enough to prevent deterioration from drying out and growth of underbrush, while it is sufficiently open to prevent the formation of raw humus. On exposed slopes brush should be scattered in order to prevent the leaf litter

from blowing away, while on other sites breaking up of the surface soil by means of a roller-harrow is an excellent means of stimulating reproduction.—*W. N. Sparhawk.*

4216. Powlett, Nigel a-Orde. **The silvicultural treatment of sycamore.** Quart. Jour. Forestry 17: 252–254. 1923.—Sycamore (*Platanus*) grows well in mixed broadleaf forests, but the canopy is apt to become broken after 50 years so that the maximum volume of timber per acre is not secured. The mixture of sycamore in beech woods, either singly or in small groups, has much to recommend it, especially on Class II soil. Pure forests of sycamore also produce excellent timber and maintain a fairly close canopy during most of the rotation. If trees are planted 7 feet apart, thinnings are necessary at 20, 35, and 50 years. At 80 years ½ of the remaining trees should be removed, and the final crop should be harvested at 100 years. On moist sites spruce and sycamore can be mixed in equal quantities to good advantage. In the early thinnings, only spruce should be removed. At 50 years, the remaining spruce and the poorer sycamore should be cut out after which the treatment will be the same as in pure stands.—*C. R. Tillotson.*

4217. Reiss. **Zur Bestandeserziehung der Fichte im Vogelsberg. [Handling of spruce stands in the Vogelsberg (Hesse-Nassau).]** Forstwiss. Centralbl. 45: 441–451. 1923.—Measurement of a 48-year-old spruce plantation on basalt soil in the Vogelsberg showed 1,384 trees to the hectare, with a total basal area (at 1.3 m.) of 19.805 square m., average diameter of 19 cm., and total volume (to 7 cm. top) of 441.7 cubic m. Including the wood taken out in thinnings and an allowance for tops, the mean annual growth amounted to 12.72 cubic m. per hectare (183.3 cubic feet per acre). Spruce 25–35 cm. in diameter is more in demand than larger sizes, and can be produced in 70–80 years. The author considers that dense, even-aged stands of spruce such as the one described will prove much more profitable than the more open, uneven-aged stands of spruce mixed with other species advocated by Wagner and others. On basalt soils, at least, pure, even-aged spruce does not suffer from the disadvantages claimed for such stands, nor do uneven-aged mixed stands show any superiority. According to Köhler's formula (crown width = ⅛ height of tree, and number of trees = area ÷ square of crown width) the above stand should have 800 trees to the hectare, with an average crown width of 3.55 m., while it actually had 1,384 trees with crowns 2.0 m. wide. To thin out 42% of the trees might stimulate the growth of those remaining, but would not increase total volume production, and would result in more and larger limbs and inferior timber. Contrary to the experience of Saxon foresters, that spruce grown in pure stands deteriorates in the 2nd generation on the same site, a 46-year-old plantation on a site previously occupied by a 90–100-year-old spruce stand has grown as well as a nearby plantation established at the same time on an old field.—*W. N. Sparhawk.*

4218. Petraschek, Karl. **Die Grundbedingungen für den wirtschaftlichen Erfolg einer Holzdestillationsanlage. [The conditions essential for the profitable operation of a wood distillation plant.]** Forstwiss. Centralbl. 45: 286–299. 1923.—The processes of hardwood and softwood distillation are briefly described. A peculiarity of the industry is that regardless of a possible shortage of one product and over-supply of another, the proportion of the various products of distillation cannot be varied; to produce a certain amount of acetate, a definite quantity of alcohol must also be made. The relative prices of wood and charcoal must be such that the operator can pay for his wood with the returns from the charcoal. Enough wood must be available in a locality to supply a plant for at least 20 years. A large plant is more economical than a small one, because of the overhead expense involved in employing a corps of technical experts. As the wood must be air-dried to 15–18% moisture, it is best to carry 1–2 years' stock in the yard. Large quantities of coal are required for distillation, and abundant cool water for condensing. Stable skilled labor and railroad facilities are requisites. With the keen competition of Sweden, North America, and other countries, it will be necessary to keep up with the most improved methods, and consequently to figure on heavy investments in plant improvements from time to time.—For a particular case under consideration, where there is no market for charcoal but a keen demand for fuel wood, the author recommends partial distillation (a resinous species is involved), stopping at 270°C. when most of the turpentine oil has been driven off and before the wood is charred. The "red coal" thus formed has a greater heating value than the original wood, weighs only ⅓ as much, and makes an especially desirable fuel.—*W. N. Sparhawk.*

4219. Saussenthaler, Harry. **Buche und Linde.** [**Beech and linden.**] Forstwiss. Centralbl. **45:** 415–418. 1922.—Instead of underplanting pine and other conifer stands with beech in order to improve the soil, as is so generally done by German foresters, the writer recommends the use of *Tilia parvifolia* and *T. intermedia*. It thrives on poorer soils than beech, endures moister situations, does not require lime, and its foliage decomposes more readily than that of beech, thereby enriching the soil and improving its texture. It is easily established, is not eaten by game, yields valuable industrial timber and pulpwood, its bast yields fiber, and the flowers are a source of excellent honey. Formerly more abundant in German forests, it has long been neglected because it does not furnish good fuel wood or mast for swine, while its dense foliage kills out grass and berry bushes.—*W. N. Sparhawk.*

4220. Saussenthaler, Harry. **Über den wilden Hopfen.** [**Concerning wild hops.**] Forstwiss, Centralbl. **45:** 383–385. 1923.—*Humulus lupulus* is harmful to young trees, particularly intolerant species such as alder, ash, and oak, in certain districts of southern Germany. While the only sure method of eradication is grubbing, damage can be largely prevented by handling the forest as a 2-storied stand, with intolerant species in the dominant class and tolerant species such as *Tilia parvifolia* in the understory.—*W. N. Sparhawk.*

4221. S[chaeffer], A. **En Suisse.** [**In Switzerland.**] Bull. Trimest. Soc. Forest. Franche-Comté et Provinces de l'Est **15:** 112–114. 1923.—The Swiss forestry organization with 1 inspector for 2,000 hectares, is compared with the French, which has 1 inspector for 12,000–15,000 hectares. The Polytechnicum at Zurich and the Journal Forestier Suisse are praised. Excerpts are quoted from an article by Schellenberg on the importance of fungi in the natural pruning of forest trees.—*J. Kittredge, Jr.*

4222. Schaeffer, A. **Est-ce un paradoxe?** [**Is it a paradox?**] Bull. Trimest. Soc. Forest Franche-Comté et Provinces de l'Est **15:** 109–111. 1923.—Referring to a previous article concerning the reserving of hornbeam, (see Bot. Absts, 13, Entry 789), a case is cited of a forest of pure hornbeam in simple coppice which might have contained valuable small standards had they been reserved 30 years ago. Hornbeam increases in value in the ratio of 1:30 in the course of a coppice rotation. This is equivalent to a rate of 12% at compound interest. Although *Carpinus* seeds abundantly, the seedlings soon disappear, so that only the sprouts need cause concern. By reserving heavily the hornbeam if nothing better is available, the sprouts will be crowded out.—*J. Kittredge, Jr.*

4223. Schüpfer. [Rev. of: Gehrhardt, E. **Ertragstafeln für Buche, Tanne, Fichte und Kiefer.** (**Yield tables for beech, fir, spruce, and pine.**) Julius Springer: Berlin, 1923.] Forstwiss. Centralbl. **45:** 438–439. 1923.—Excepting that for beech, the tables are the result of combining several tables, hence give average values.—*W. N. Sparhawk.*

4224. Schüpfer. [Rev. of: Junack. **Anleitung für Forsteinrichtungsarbeiten nach dem Forsteinrichtungssystem, das sich eignet für Fachwerk und Dauerwald.** (**Guide to forest regulation according to methods suitable for forests handled by the compartment system and for continuous forest.**) *16 p.* J. Neumann: Neudamm, 1922.] Forstwiss. Centralbl. **45:** 437–438. 1923.

4225. Schüpfer. [Rev. of: Levaković, Anton. **Die Bestandsmassenaufnahme mittels Probestämmen.** (**Determining volume of stands by means of sample trees.**) Wilhelm Frick: Wien and Leipzig. 1922.] Forstwiss. Centralbl. **45:** 395–398. 1923.—Schüpfer does not agree with the author's assertion that separation of height-classes is always unnecessary. Accuracy requires it in stands where trees of the same diameters vary greatly in height. The Draudt, Urich, Hartig, and modified methods of choosing sample trees are discussed.—*W. N. Sparhawk.*

4226. Schüpfer. [Rev. of: Schwappach. **Ertragstafeln der wichtigeren Holzarten in tabellarischer und graphischer Form.** (**Yield tables for the more important** [German] **trees.**) 2nd ed., J. Neumann: Neudamm, 1923.]—Forstwiss. Centralbl. **45:** 473. 1923.—Including several new tables, this book presents yield data for the common German species of *Betula, Fagus, Quercus, Alnus, Fraxinus, Picea, Pinus,* and *Abies.*—*W. N. Sparhawk.*

4227. Seeholzer. **Die Wirtschaft im Forstamtsbezirk Riedenburg.** [**Forest management in the Riedenburg district.**] Forstwiss. Centralbl. **45:** 244–254, 328–340. 1923.—The soil, topography, and climate of this forest in the Jura Mountains are described, and the

principles governing silvicultural practice are discussed. To fulfil the object of management —continuous production of maximum returns in volume and value at the lowest cost—the following measures are applied: (1) a mixture of species, thereby utilizing the soil more completely and preventing deterioration of site with the formation of raw humus; (2) natural reproduction, thus keeping costs at a minimum and at the same time getting trees adapted to the site; (3) uneven-aged stands, which secure maximum benefit from the available sunlight, have an irregular canopy which is less susceptible to wind damage, and allow fairly heavy cutting in the older age-classes without bad effects on soil conditions; (4) individual treatment of small units of the stand, suited to local conditions, but in accord with careful plans; (5) maintenance of continuous forest and sustained yield. The silvicultural system consists of thinnings and selection cutting to open up the stand and prepare the way for natural reproduction, followed by a final cut in the form of strip or "border" fellings, proceeding gradually from north to south. Special effort is made to get fir and beech seedlings established ahead of the main felling, which secures spruce reproduction.—*W. N. Sparhawk.*

4228. Show, S. B., and E. I. Kotok. **Forest fires in California 1921–1920: An analytical study.** U. S. Dept. Agric. Dept. Circ. 243. *79 p.* 1923.—"This study has singled out and discussed the main factors—physical and human—in the problem of protection against forest fires."—*L. R. Hesler.*

4229. Sklawunos, Constantin G. **Über Haubarkeits- und Zwischennutzung und deren Wechselverhältniss in der Waldertragsregelung. [The interrelation of the final and intermediate fellings in forest regulation.]** Forstwiss. Centralbl. **45**: 300–315, 369–382, 451–470. 1923. —Forest regulation includes the determination of the allowable annual cut on the basis of continuous sustained yield in both quantity and quality, and control of cutting by means of office records and field inspection. Until the adoption of clear-cutting late in the 18th century there was no distinction between intermediate and main or final cut; since then there has been considerable controversy over the distinction between the 2 categories of yield and on the question of basing cutting control on both together or only on the main cut. This paper is the 1st to consider these questions in the light of all the available literature. Various arguments in favor of fixing the cutting budget on the basis of the combined yield from final and intermediate fellings are presented and refuted. The writer concludes that the 2 kinds of felling should be distinguished by their purpose and effect: intermediate fellings are to stimulate the growth of the final stand, without reducing the main cut, while main or final fellings are those whose purpose is the harvesting of the timber crop or preparation for a new crop (reproduction cuttings). In high forest handled by a clear cutting or "stand" system, the cutting budget should be based on the main cut, while the intermediate fellings should be handled independently without regard to a fixed budget, except as to area. For forests handled by selection systems such separation is impossible.—*W. N. Sparhawk.*

4230. Somerville, W. **Growth in thickness of a tree.** Quart. Jour. Forestry **17**: 98–114. *2 fig.* 1923.—This is a very full description of the phenomenon of radial growth, the differences between the spring and summer zones of annual growth rings, the characteristics of heart wood and medullary rays, and the storage of plant food in the medullary rays.—*C. R. Tillotson.*

4231. Trabut, L. **Les Eucalyptus rouges ou faux-acajou. [The red species of Eucalyptus or false mahogany.]** Compt. Rend. Acad. Agric. France **1920**: 37–39. 1920.—Several species of *Eucalyptus* introduced into Algeria have proved of economic value, especially those with red or rose-colored wood. The following of this type are already common in Algeria: *E. rostrata*, *E. algeriensis* (*E. rostrata* × *E. rudis*), *E. botryoides* × *E. rostrata*, *E. Trabuti* Vilm., *E. Rameliana* Trab., *E. tereticornis* and hybrids, *E. rudis*, *E. punctata*, *E. diversicolor*.—*E. A. Bessey.*

4232. Wechel, A. Te. **Over het krimpen van geschilde en ongeschilde stammen na de velling. [Shrinkage of peeled and unpeeled stems after cutting.]** Mededeel. Landbouwhoogeschool Wageningen **27**[1]: 1–11. *2 pl.* 1923.—Peeled wood dries in 1 summer, whereas unpeeled wood requires 2–3 summers. Covering of the ends, especially in the case of peeled wood, does not affect the process of drying. While peeled stems lost 8.6–9.3% of their volume, unpeeled ones lost only 0.3–1.2%. Painting the ends has little influence upon shrinkage. With total drying, peeled Tilia poles shrank 10% in volume. When the ends were covered with paint, the shrinkage amounted to 9%.—*J. C. Th. Uphof.*

GENETICS

Orland E. White, *Editor*

(See also in this issue Entries 4074, 4080, 4098, 4103, 4109, 4112, 4134, 4138, 4299, 4312, 4346, 4457, 4530, 4572, 4738)

Note: **Error.**—In May issue, Entry 3496, last line, *now* should read *not.*

4233. Anonymous. **Breeding Angora rabbits for wool.** Jour. Ministry Agric. Great Britain **30**: 68–69. 1923.—The housing, feeding, grooming, and plucking and marketing of the wool of Angora rabbits are described. Plucking is satisfactory only when the rabbit is in full moult. The times of moulting vary greatly and seem to depend on the condition of the parents when mating takes place. When the parents are "tight" in coat it is believed that the progeny moult less frequently, and therefore, produce longer wool. The average Angora rabbit produces about 12 ounces of wool per annum.—*H. C. McPhee.*

4234. Anonymous. **Evolving biology.** [Rev. of: Dendy, Arthur. **Outlines of evolutionary biology.** *3d ed., xliii + 481 p.* Constable and Co.: London, 1923.] Nature **112**: 574. 1923.

4235. Bagg, Halsey J. **The absence of one kidney associated with hereditary abnormalities in the descendants of X-rayed mice.** Proc. Soc. Exp. Biol. and Med. **21**: 146–149. *1 fig.* 1923.—Three hundred autopsies on descendants of X-rayed mice have shown 50 individuals to possess but 1 kidney. Exposure to X-rays has produced hereditary blindness. Nineteen of 33 animals with but 1 eye abnormal showed the eye and kidney defect on the same side of the body. In cases where both eyes were either normal or completely blind approximately equal numbers were found lacking either the right or left kidney. In 3 cases, eye, club-foot, and kidney abnormalities were present in each animal. The present evidence indicates that the kidney abnormality may be increased by breeding from animals heterozygous for this condition.—*Robert T. Hance.*

4236. Bateson, W. **Interspecific sterility.** Nature **110**: 76. 1922.—In replying to criticisms [Nature **109**: 775–777] on his Toronto address [see Bot. Absts. 11, Entry 3805], Bateson holds that we still await the production of an indubitably sterile hybrid from completely fertile parents, arising from a single common origin under critical observation. All domesticated animal races, so far as known, as also with plants, never produce sterile hybrids when intercrossed among themselves. Analogous sterile hybrids are constantly found in natural species. In studies of variation the origin of many differences have been witnessed but not this origin of interspecific sterility. The instance cited by Cunningham of tetraploidic species is scarcely of moment as they, instanced by *Oenothera gigas,* are in reality unresolved pairs of twins. The examples cited of alleged intersterile mutants of *Drosophila* are not found to be maintained. [See also Bot. Absts. 12, Entry 2419.]—*L. R. Waldron.*

4237. Becker, J. **Über die Züchtung der Tomate.** [**Tomato breeding.**] Gartenwelt **26**: 312–315. 1922.—A list is given of the dominant and recessive characters in the fruit and plant and the inheritance of color is explained in detail. The increase in yield obtained from certain F_1 crosses is mentioned as is also the technique required in breeding.—*Richard Wellington.*

4238. Blaringhem, Louis. **Nouvelles recherches sur les hybrides.** [**New researches on hybrids.**] Compt. Rend. Assoc. Française Adv. Sci. **46**: 322–330. *Illus.* 1923.—This is a summary of results from crossing species types of *Geum. G. intermedium* originates and persists in the natural state, is uniform, fertile, and stable, placing it without doubt among good species; but it has been produced artificially by crossing *G. urbanum* with *G. rivale.* The author's experiments indicate that climate may limit or accentuate individual tendencies of hybrids as to fertility, this influence being much greater on recent hybrids whose equilibrium is delicately balanced. He thinks it important to follow the progeny of fixed hybrids such as *G. intermedium* under different climates and offers seed to those interested.—The paper emphasizes points relating to fertility and methods of fertilization rather than detailed descriptions of dominant characters, which are shown to some extent in 3 illustrations.—*Charlotte Elliott.*

4239. Bonnier, Gert. **On alleged seasonal variations of the sex ratio in man.** Zeitschr. Indukt. Abstamm.- u. Vererb. **32**: 97–107. 1923.—It has been maintained, especially by Heap, that there is a marked breeding season revealed by the human birth rate and that this is associated with changes in the sex ratio. An examination of over 2,000,000 Swedish records reveals

no significant variation in sex ratio but a definite seasonal variation in births, the numbers for March being consistently highest, those for November lowest. The March and November averages are in the relation of 108:92. A re-analysis of Heap's records does not seem to bear out his contention that there is a significant correlation between "breeding season" and sex ratio.—*C. H. Danforth.*

4240. Bryce, G., and C. H. Gadd. **Hevea selection.** Trop. Agric. 60: 94-96. *2 pl.* 1923.—Experiments to determine whether high yielding ability of individual rubber trees is heritable are reported. The average yield from 161 young trees was lower than the yield of the high yielding mother tree but higher than the average of other groups of young trees. Yield character in *Hevea* is heritable. Only the ♀ parent of the trees in the experiment was known. The coefficient of correlation between the number of latex-vessel rows in the bark and yield was .459 ± .042. The relative merits of histological examination and actual yield records as methods of selecting high yielding trees are discussed; the latter are considered more reliable. High yielding trees can be secured more readily by grafting from individual high yielding trees than by attempting to produce homozygous high yielding strains by breeding.—*J. L. Collins.*

4241. Calhoun, Arthur Wallace. **The economic factor in the problem of eugenics.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. *407–412.* Williams & Wilkins Co.: Baltimore, 1923.—Economic factors have always put a premium on appropriate qualities. The whole appeal of America has been primarily economic. Migration is a matter of economic selection, and the dominant influence in making America has been overwhelmingly bourgeois. With changing economic conditions changing ideals are encountered. Marriage selection and birth control are largely economic matters. While the popular attitudes and ideals may be in large measure determined by social inheritance it seems evident that the far-reaching effects of economic factors must tend to modify not only the social inheritance but also the biological character of a people.—*C. H. Danforth.*

4242. Child, C. M. **Physiological polarity and symmetry in relation to heredity.** Genetics 8: 336–354. *14 fig.* 1923.—Current theories concerning embryological development offer no explanation for differentiation. The chromosome theory of heredity tells us that each cell inherits the whole germ plasm, but as to the manner in which different cells and cell groups become different, it has nothing to say. Child suggests "if polarity and symmetry in their simplest terms are quantitative physiological gradients in protoplasms, which are determined in the final analysis directly or indirectly by a differential action of some factor external to the protoplasm concerned, it follows that the physiological radius or axis represents a reaction to environment of a specific protoplasm. In other words, the physiological gradient is the result of the reaction to the environment factor, but the nature of the organs and parts which arise at different levels of a gradient is determined by the hereditary constitution of the protoplasm. The facts indicate that polarity and symmetry originate as physiological reactions of specific protoplasms to differentials of some sort in the environment of the protoplasm concerned. These reactions give rise to gradations in physiological condition, the physiological gradients, which provide a physiological basis for the realization of different hereditary potentialities in different regions, cells or cell groups."—*Robert T. Hance.*

4243. Clark, C. F. **Sterility studies.** Proc. Potato Assoc. Amer. 9: 78–81. 1922.—This is a summary report of studies of the nature of sterility of potatoes largely carried on at Presque Isle, Maine. Germination of pollen was tested on a number of media but best results were obtained with a mixture of 1% agar and 15% cane sugar. Pollen was studied from 210 seedlings, miscellaneous varieties from different parts of the world, and from 4 wild species. On the basis of condition of the anthers, quantity of pollen, and percentage of grains containing granular material, the varieties studied were classified into 4 groups, only 1 of which contained good pollen parents. Practically all varieties produced seed if pollinated with good pollen and given good environmental conditions. With respect to setting of seed, varieties were classed into 4 groups, 3 of which varied with respect to the relative ability to produce seed, while the 4th group included varieties producing parthenocarpic fruits. Premature abscission of the buds or blossoms appears to be largely a response to environment. Physiological incompatibility is not an important factor in sterility of *Solanum tuberosum,* although in 1 wild species, *S. Chacoense,* this type of sterility is highly developed. The fact that sterility exists in wild

species is opposed to the argument that such sterility in *S. tuberosum* is due to deterioration of sexual reproductive functions on account of excessive development of vegetative parts.—*C. H. Myers.*

4244. Clément, Hugues. **Essai d'hybridation entre une chienne et un renard. [An attempted cross between a bitch and a fox.]** Compt. Rend. Soc. Biol. 89: 1300–1301. 1923.—Sixty-three days after artificial fertilization the dog was declared by its owner to be pregnant. Eight days later milk could be forced from the breasts by a light pressure. A week later all signs of pregnancy had disappeared.—*Oran Raber.*

4245. Cooper, E. **Orchid growing and hybridizing.** Farm & Gard. 11: 6–10. *Illus.* 1923.—The author discusses the history of orchid culture in England and the methods of propagation and hybridization.—*Charlotte Elliott.*

4246. Correns, Carl. **Geschlechtsbestimmung und Zahlenverhältniss der Geschlechter beim Sauerampfer (Rumex acetosa). [Sex determination and numerical ratios in sheep sorrel (Rumex acetosa).]** Biol. Zentralbl. 42: 465–480. 1922.—*R. acetosa* as frequently reported shows an excess of females. Hoffmann finds 23.26% males, Sprecher 29.33% males. Raunkiär found in *R. thyrsiflorus* 9.56% males; among the females 7 gave a numerical preponderance of female offspring. Raunkiär concludes from his results that the female is heterogametic, the male homogametic. Correns states that there were 4 ways to determine which sex is heterogametic: (1) chromosomal differences in male and female, (2) sex-linked inheritance, (3) hybridization between plants in which the sexes are separate with those of the mixed sex, (4) the experiment in which the competition between pollen tubes of different pollen grains to reach the embryo sac is controlled (Correns' experiments on *Melandrium*, 1917, 1921). The experiments with *R. acetosa* concern themselves with the last method. Three female and 2 male plants were selected. The females were bisected, the halves put in separate pots. Each half was to be pollinated with one or the other of the 2 males in 2 groups; one group received much pollen, the other, the sister halves, received little pollen. There followed a profuse setting of seed in the 1st case and a poor setting in the 2nd. Seed from each group showed a high percentage of germination. Offspring from the richly pollinated were overwhelmingly female, 6.31–12.60% male. Offspring of the poorly pollinated females showed a higher percentage of males, 28.99–32.65%. The writer states that it is quite evident that a struggle goes on between the male- and female-determining pollen grains and therefore the male sex is heterogamic. In *Rumex*, where only 1 seed is set in an ovary, the struggle is more intense than in *Melandrium*, where 300–400 seed are set in a capsule. Correns suggests the term "proximal" to denote a condition in the sex proportions in which the least possible competition exists between the gamete cells, and "distal" to denote a condition in which there has been stimulation towards competition. Between these lies the spontaneous relationship, the condition of a given race when found and counted in the open. *R. acetosa* in nature approaches the proximal condition. While the foregoing experiments showed that the male sex is heterogametic they did not indicate what becomes of the 20% males. Correns found an increase in the proportion of males to females (average of 42.1%) in a cross between normal females and a male the pollen of which was taken from a variegated branch. Pollen grain examination from different males showed abortion of grains varying from 1.2% to 15.8%. This does not account for the 20% fewer males. In poorly pollinated females many seed are set. There are also aborted embryos and many unfertilized flowers. The data do not account for the lower percentage of males. The assumption that male embryos are less resistant than female embryos suggests itself because of the longer life of the female plants. Examinations of the proportion of male and female plants at different ages show that with increase in age, and it becomes most apparent after the 6th year, the females predominate. In general the male plants are smaller than the female.—*Cecil Yampolsky.*

4247. Cripps, L. D., Major Greenwood, and Ethel M. Newbold. **A biometric study of the inter-relations of "vital capacity," stature, stem length and weight in a sample of healthy male adults.** Biometrika 14: 316–336. 1923.—The authors tests, by the method of multiple regression, the accuracy of the prediction of "vital capacity" from anthropometric measurements. The data used are measurements of 1,238 candidates for commissions in the Royal Air Force. The authors find that the conclusions reached by this method do not differ greatly

from Hutchinson's conclusions, reached 80 years ago, and show that with minor exceptions Hutchinson's method is as good or better than its recent modifications. While the correlations are all significant, the variability of the vital capacity of normal male adults remains very great, even when as many as 4 independent variables are used for estimation.—*Sylvia L. Parker.*

4248. Cunningham, J. T. **Age and area and natural selection.** Nature **111**: 287. 1923.—Natural selection is not causally connected with the origin of specific differences. This letter to the editor gives the author's views in support of this statement.—*J. L. Collins.*

4249. Davis, B. M. **Pollen and seed-sterility in hybrids.** Amer. Jour. Bot. **10**: 462–467. 1923.—Pollen and ovule abortion is frequent in hybrids. Zygotic sterility, the failure of the zygote to develop, or the early death of the embryo, is also common in hybrids. The theory of lethal factors is accepted for these types of sterility. Impure species that breed true because of balanced lethals are discussed with special reference to Oenotheras and to the problems of genetics and taxonomy.—*A. B. Stout.*

4250. Demerec, M. **Inheritance of white seedlings in maize.** Genetics **8**: 561–593. 1923.—White seedlings found in varieties of maize are determined by many different factors. Analysis shows the existence of 7 factors and there are indications of several more.—Three of the 7 factors are single Mendelian recessives, 2 are duplicate genes located in separate chromosomes, while 2 others are duplicate genes located in the same chromosome with about 36.9% of crossing over. The linked duplicate genes are in the same chromosome with 1 of the genes for endosperm color, the probable order being $W_5 - Y - W_6$ with about 25% crossing over in each region.—*J. H. Kempton.*

4251. Donaldson, John C. **Note on the weight of the adrenals in crosses between the albino and the wild Norway rat (Mus norvegicus).** Proc. Soc. Exp. Biol. and Med. **21**: 157–160. 1923.—Wild gray rats have much heavier adrenals than do the domesticated albinos. $F_2 - F_4$ descendants of crosses between these 2 forms continue to show a lower weight of adrenal in the albino than in the pigmented form.—*Robert T. Hance.*

4252. Dorsey, M. J. **Sterility in relation to horticulture.** Amer. Jour. Bot. **10**: 474–484. 1923.—The paper consists of a discussion of the general question of fruit-setting. After a survey of the factors influencing the crop yields of various pomes, drupes, and berries, it is shown that they may be placed under 3 heads,—weather, genetics, and nutrition. The effects of these factors may appear at any 1 of 3 drops: (1) the drop which includes all pistils in which growth is stopped before the embryo sac is completely formed; (2) the drop which includes all pistils in which fertilization has failed to take place; (3) the drop which is made up of those fruits in which the embryo has become aborted. Except in cases of killing by frosts and freezes, weather affects fertilization chiefly by causing delay in the processes taking place at the time of flowering, and the effect is seen in the drop which includes all pistils in which fertilization fails to take place. Suggested control measures are orchard heating, use of pollenizers the pollen of which germinates at lower temperatures than others, and the application of sodium nitrate. Genetic factors affect the crop through dioeciousness, self- and cross-sterility, and aborted sex structures. The effects are seen in the 1st drop when the embryo sac becomes aborted; in the 2nd drop when, because of incompatibility, the rate of pollen tube growth is too slow; and in the 3rd drop when the embryo becomes aborted. These factors may be controlled by mixed planting. The effect of deficient nutrition varies in different fruits, and the factors are probably connected with the carbohydrate-nitrogen balance. The bringing about of optimum nutritional conditions for fruit-bud initiation, fruit-setting, and fruit development depends on a control of the carbohydrate-nitrogen-moisture ratio.—*Fanny Fern Smith.*

4253. Fournier, P. **Un nouvel hybride de Salix (Salix negata P. Fournier S. fragilis × cinerea P. Fournier).** [**A new hybrid of Salix (Salix negata P. Fournier S. fragilis × cinerea P. Fournier.**] Bull. Soc. Bot. France **69**: 515–518. *Illus.* 1923.—Since a long period of time separates the normal flowering periods of *S. capreal* and *S. fragilis*, crosses between the 2 species were not thought possible. Hence the name *S. negata* given to the hybrid produced when the flowering of *S. capreal* was retarded by cold. The author gives a detailed description of *S. fragilis* × *S. cinerea.*—*Charlotte Elliott.*

4254. Gayer, Julius. **Die hybriden Aconita der Ostalpen und Sudeten. [The hybrid Aconites of the eastern Alps and Sudetic Mountains.]** Verhandl. Zool.-Bot. Ges. Wien 72: 35–41. 1923.—Hybrid species of *Aconitum* of the sections or subgenera *Lycoctonum* and *Anthora* occur in the Carpathian Mountains but not in the Eastern Alps or Sudeten. Of the section or subgenus *Euaconitum* hybrids of the species *variegatum* × *paniculatum* are known only in southwest Switzerland but hybrids of *Napellus* × *variegatum* and *Napellus* × *paniculatum* occur in the region under discussion.—The author gives citations, synonyms, distribution and descriptions of the hybrids of these species occurring in the Eastern Alps and Sudeten Mountains.—*Charlotte Elliott.*

4255. Gowen, J. W. **Studies in milk secretion XIV. The effect of age on the milk yields and butter-fat percentages of Guernsey Advanced Registry cattle.** Maine Agric. Exp. Sta. Bull. 311. *9–20. 2 fig.* 1923.—In this paper are presented certain phases of the problem of the relation of age to the milk yield and butter-fat percentage of Guernsey cattle on the 365-day Advanced Registry tests. An equation is given for determining the relation of age at the commencement of the test to the milk yield or butter-fat percentage of the cow. The data show that milk yield rises at a decreasing rate until the age of 8.77 years; from this age milk yield decreases at an inceasing rate as age advances. Butter-fat percentage declines as the age of the cow increases at a rate which amounts to about 0.3% during the period from 2 to 10 years of age. Tables are given which enable the reader to determine the 8-year milk yield or butter-fat percentage of a cow of different production at other ages, provided the conditions under which the test is made are the same as those for the Advanced Registry test.—*H. C. McPhee.*

4256. Hammond, John. **On the relative growth and development of various breeds and crosses of pigs.** Jour. Agric. Sci. 12: 387–423. *5 fig.* 1922.—Data were collected over a period of 10 years. Many tables are presented showing growth rates of pigs of various breeds at different ages from 3 to 11 months; also tables giving relative weights of carcass and waste of pigs slaughtered at different ages up to 11 months. Ten breeds and 11 cross-breeds were considered. Cross breeds frequently produced animals heavier than the average weights of either parent breed. Larger animals are more economical producers of meat than smaller ones.—*J. W. Shive.*

4257. Heusser, K. **Kunstmatige Bestuivingen bij Hevea brasiliensis in 1920. [Controlled pollination in Hevea brasiliensis in 1920.]** Mededeel. Alg. Proefsta. A. V. R. O. S. Rubberser. 27. *6 p.* 1920. [Reprinted from: Arch. Rubbercult. 5: 11–16. 1920.]—Of 7,910 pollinations made, 6,710 were cross and the remainder self. Table I gives the parents of the cross, their average daily yield during 1919, the number and per cent of successes and failures, the number of seed produced, and the per cent of germination. Of the crosses 10.8% were successful; these yielded 2,187 seed, 2,018 of which germinated. This represents the result of crossing 20 different trees in 35 different combinations. Of the 6 trees that were selfed only 2 produced seed—33 seed, of which 31 germinated.—*Cecil Yampolsky.*

4258. Hilson, G. R. **Methods of examination of certain characters in cotton.** Agric. Res. Inst. Pusa Bull. 138. *28 p., 2 pl.* 1922.—Combing the lint on 1 side of the seed and measuring from the butt end of the median line to from 3 to 5 o'clock on the halo, using 5 seed chosen at random, gave very accurate length-of-lint measurement. Other methods were tried and data are given concerning them. Seed weight and weight of lint per seed of a lot may be accurately determined from 100 seed, chosen if possible from 100 locks. Fluctuations in humidity cause variation in weight but are not ordinarily significant.—*N. J. Giddings.*

4259. Hyman, O. W. **Spermic dimorphism in Fasciolaria tulipa.** Jour. Morphology 37: 307–383. *11 pl., 1 fig.* 1923.—In the mollusk Fasciolaria 2 kinds of sperms are found—typical and atypical (depending on the behavior of the chromatin), the latter outnumbering the former 50 to 1. An X-chromosome is identified. Mitochondria are studied and believed to be self perpetuating. The Golgi apparatus and its behavior are described.—*Robert T. Hance.*

4260. Ikeno, Seiitiro. **Erblichkeitsversuche an einigen Sippen von Plantago major. [Genetic investigations on some forms of Plantago major.]** Japanese Jour. Bot. 1: 153–212. *3 pl.* 1923.—Three teratological forms of *Plantago major* were used for the experiments: *contorta, contracta, variegata.* The *contorta* form possesses leaves which wind in an abnormal

way either to the right or to the left; the direction of the winding is not heritable. By selfing, *contorta* proved to be constant; but some *typica* (normal) plants occur in the offspring. This phenomenon is called "reversion" or "back mutation." A cross of *contorta* (*tt*) × *typica* (*TT*) follows the monohybrid scheme with *typica* dominant. *Typica* plants produced through reversion are *Tt*. In some crosses no homozygotic individuals occurred, which is explained through 2 lethal factors, *L* and *l*. These 2 factors are linked with *T* and *t*. These heterozygotes (*TtLl*) are called respectively, *pseudo-contorta* and *pseudo-typica*. *L* and *l* together act as balanced lethals. In zygotes (*LlTt*) the dominance of *T* over *t* is incomplete, caused by the balanced lethals. Unfertilized seed are more numerous in the *pseudo* types than in *typica* due to lethal factors. In crosses of *pseudo* types with *typica* (*eutypica* = *TT*), the F_1 will be *typica*. All zygotes with *TTL* die: zygotes *Ttl* survive. The factor *l* causes an incomplete dominance of *T*; but the influence of *l* is much less than that of *L* upon the incompleteness of the dominance as shown by crosses of *pseudo* types with *eucontorta* (*tt*), where both *typica* and *contorta* appeared in the offspring. Four exceptions are explained through crossing over. Differences in different seasons are due to climate, nutrition, etc. The lethal factors originated apparently simultaneously by mutation.—*Contracta* (*aa*) is a dwarf form. Here also reversion to *typica* occurs. Typica (*AA*) is dominant, a monohybrid case in *typica* crosses.—*Variegata* (*gghh*) also shows reversion to green forms. If these green forms are selfed they split either 3:1 or 15:1. In crosses between green constant × *variegata*, the F_1 was green and in the F_2 ½ of the offspring split after the 3:1 and the other ½ after the 15:1 scheme. A workable hypothesis is given in the simultaneous change of 2 factors.—*L. A. Waitzinger.*

4261. Johnson, Dymple Bryant. **The life stories of a class of 27 high school graduates in relation to longevity and social progress.** 2nd. Internat. Congress Eugenics. Vol. II. Eugenics in race and state. *386–396*. Williams & Wilkins Co.: Baltimore, 1923.—These graduates of an Arkansas high school who are known to be of American stock, answered a questionnaire covering their life work, family history, economic status, etc. The health of the majority is excellent and they are fairly long lived. Considerable influence of the conscientious high school teachers is noted and also a general passion among the population for education. This group has been economically successful. The majority have children and favor intelligent birth control for the conservation of the strength of the mother as well as of the children and in order that adequate training advantages may be available for the latter.—*Robert T. Hance.*

4262. Keith, Arthur. **The adaptational machinery concerned in the evolution of man's body.** (12th Huxley Memorial Lecture.) Nature 112: 257–268. 1923.—Huxley, with the intuition of genius, perceived, what we may still believe today, that the forces which give man his present form were latent in the germ plasm of the simian ancestors. Our specialized musculature is not what it is because of habits of our ancestors but because of inherent tendencies which restricted it to more or less predetermined lines of development. The machinery which regulates development is organized on a functional rather than on an anatomical basis. Many characteristic human traits occur as more or less frequent departures in lower forms, and a long list could be made of features of the human adult which are common to the foetus of apes, such, for example, as the size of the head. The human adult approaches the anthropoid foetus more than the adult ape.—*C. H. Danforth.*

4263. King, Robert L. **Heteromorphic homologous chromosomes in three species of Pseudotrimerotropis (Orthoptera: acrididae).** Jour. Morphology 38: 19–63. 8 pl., 2 *fig.* 1923.—The chromosome homologues of the grasshopper species *Pseudotrimerotropis thalassica*, *P. caeruleipennis* and *P. cyaneipennis* are in certain cases heteromorphic (odd in the size or the point of fiber attachment). The homologues separate in the 1st maturation division and assort at random in relation to the homologues of the other heteromorphics and to the sex-chromosomes. A possible effect of heteromorphism on crossing-over is suggested.—*Robert T. Hance.*

4264. Köszl, Otto. **Neue Versuche auf dem Gebiete der Pflanzenzüchtung. [Recent investigations in the field of plant breeding.]** Wiener Landw. Zeitg. 73: 325–326. 1923.—This is a condensation of an account given by the author before a convention of plant breeders in Vienna in May, 1923, of his investigations in the hybridization of wheat, the acclimatization of maize—a toleration of −12°C. is reported—, and the successful production of a winter oat.—*F. Weiss.*

4265. KRANTZ, F. A. **The application of genetic principles to potato breeding.** Proc. Potato Assoc. Amer. 9: 81–86. 1922.—In 1909 a cross was made between Sir Walter Raleigh and an unnamed variety from South America. Second generation populations were grown in 1913, 1921 and 1922. Selfed progeny of the parents were grown for purposes of comparison with the F_2 generation. The characters studied were fertility, color of tubers, shape of tubers, and time of maturity. In this cross, which involved a variety of medium or small viable pollen production and another which produced abundant viable pollen, it was found possible to select F_1 plants which were self-fertile. The Sir Walter Raleigh parent, when selfed, gave a segregation for color of tuber, indicating that varieties with white tubers and purple sprouts are heterozygous for purple and red color and that a homozygous condition is necessary for the production of colored tubers. This apparent discrepancy with Salaman's results with respect to purple color of tubers may possibly be explained by the different location of the pigment. The color in Salaman's Congo Black may have been due to purple flesh whereas in Sir Walter Raleigh the color is due to pigment in cells just beneath the skin. Shape of tuber is apparently due to a single factor difference for length. Although both parent varieties were classed as late maturing, F_2 segregates differed by more than 60 days in time of maturity, indicating definite segregation with respect to maturity.—*C. H. Myers.*

4266. KRISTOFFERSON, KARL B. **Crossings in Melanium-violets.** Hereditas 4: 251–289. *3 fig.* 1923.—A cross between an autogamous form of *Viola arvensis* and a herkogamous form of *V. tricolor* gave a herkogamous F_1 generation. The F_2 generation showed a monohybrid segregation but the author states the segregation probably depends on 3 morphological characters. In another cross the F_1 generation was autogamous. A dihybrid segregation of color was obtained from a cross between the violet-flowering *V. tricolor* and the light yellow *V. arvensis*. The inheritance of length of honey-guide and color of spur-petal were noted. A dark-green spot on the front of the style dominated the lack of a spot in F_1 and in F_2 segregated as a single Mendelian factor. A form of *V. arvensis* with white spotted leaves behaved as a recessive to the normal green and in F_2 segregated as a monohybrid. Inheritance of the size of the corolla and the labellum were noted as also the correlation in F_2 between the length of the upper petals, the spur petal, and the development of the labellum. Crosses between a type with erect main axis and erect branches with a type with prostrate axis and branches and types with different height showed continuous variation in F_2. Judging from the variation of the F_2 generation of crosses between *V. tricolor* and *V. arvensis* and the variation in nature in these species the author was of the opinion that they should be combined in 1 species, *Viola tricolor* L.—*Richard Wellington.*

4267. LAIBACH, FRIEDERICH. **Die Abweichungen vom "mechanischen" Zahlenverhältniss der Lang- und Kurzgriffel bei heterostylen Pflanzen.** [**The deviations in the "mechanical" proportions of the long and short style in heterostylic plants.**] Biol. Zentralbl. 43: 148–157. 1923.—The author experimented with the 2 style forms of *Linum austriacum* L. Plants of both forms show considerable variation in amount of seed produced in case of selfing or in case of illegitimate pollination. Short style plants furnish in general less seed than "long style." Legitimate pollination produces about 2 or 3 times as much seed as the above described pollinations.—Seed from the "long style" if grown in a pure stand (selfed or illegitimate pollination) produced 81% long style and 19% short style; if grown in a mixed culture with short style plants (legitimate pollination) the offspring were 55% long style vs. 45% short style. Seed from short style, if grown as a pure stand, gave 51% long style and 49% short style. The deviation from the expected ratio of 1:1 in the descendents of the long style plants, especially if grown in a pure culture, is explained through illegitimate fertilization. Physiological differences in the 2 genotypically different pollens of the short style may be looked for by further experimentation.—*L. A. Waitzinger.*

4268. LINDHARD, E. **Zur Genetik des Weizens. Eine Untersuchung über die Nachkommenschaft eines Kolbenweizen aufgetretenen Speltoidmutanten.** [**Concerning the genetics of wheat. A study of the progeny of a speltoid mutation appearing in winter wheat.**] Hereditas 3: 1–90. *10 fig.* 1922.—This paper gives results of segregation of types and characters of a speltoid mutant and its progeny discovered in a square-head pure line. Although there were differences in the modes of inheritance of different progeny lines, as a rule selfed heter-

ozygotes segregated into square-heads (normal type) and spelt-heterozygotes in more or less definite ratios varying from 1:1 to 1:8. The formula is ♀ $(1\ N + n\ Sp) \times ♂\ (N) = 1\ NN : n\ SpN$ where N = square-head, and Sp = spelt; with the assumption of total elimination of Sp gametes, the ratio of normals to spelt-hererozygotes will depend on the frequency number (n) of the reduplication of the ♀ Sp gametes. To explain the occasional production of spelt-homozygotes, a but partial elimination of ♂ Sp gametes is assumed, which yields normals, spelt-heterozygotes, and spelt-homozygotes in proportions varying according to the value of (n) and the extent of the elimination of ♂ Sp gametes.—Reciprocal crosses with square-heads (normal) gave different results. None of the 16 normal × Sp-heterozygote crosses produced speltoids, whereas practically all 25 Sp-heterozygotes × normal crosses produced normals and Sp-hetererozygotes in the same proportions as would have been obtained had the speltoid parents been selfed.—Evidence is presented showing linkage of beardedness with the spelt-complex. But since in certain instances these factors segregate independently, it is believed that they are carried in different chromosomes which follow each other in mitosis. This introduces a conception of linkage, different from the Morganian conception of linear arrangement of genes in the same chromosome. Among the progeny of the spelt-heterozygote mutant, a number of new types appeared, both hetero- and homozygotes, such as compactum, common, dwarf, early, late, and a very late form which stooled freely, rarely producing a spike. Their inheritance, and relationship to spelt character are discussed.—*S. Boshnakian.*

4269. McClintock, J. A. **Seed transmission of root-knot nematode resistance in the peach.** [Abstract.] Phytopathology **14**: 62. 1924.

4270. Macbride, E. W. **Embryology and use-inheritance.** Nature **112**: 357–361. 1923. —Nature prints Macbride's comment upon Keith's lecture in Nature [see Bot. Absts. 13, Entry 4262] and a reply by Arthur Keith.—*O. A. Stevens.*

4271. Mains, E. B., and C. E. Leighty. **Resistance in rye to leaf rust, Puccinia dispersa Erikss.** Jour. Agric. Res. **25**: 243–252. *2 pl.* 1923.—Sixty-eight selections and varieties of rye, including such varieties as Abruzzes, Giant Winter, Henry, Invincible, Ivanov, Mammoth Winter, Mexican, Petkus, Rosen, St. John, Star, Von Ruemker, Wisconsin No. 2 (Schlanstedt selection) were tested for susceptibility to the leaf rust of rye, *Puccinia dispersa.* All showed many types of susceptibility. None was uniformly resistant but all the varieties and strains tested showed at least a few individuals highly resistant. The different degrees of susceptibility found are described and illustrated. Crosses made by bagging together heads of highly resistant plants showed gradations in the susceptibility of the offspring from complete immunity through various intermediate grades of resistance to high susceptibility. This would indicate that resistance to this rust was inherited as a dominant character, the production of intermediate types possibly indicating complicating factors.—*E. B. Mains.*

4272. Mains, E. B., J. F. Trost, and G. M. Smith. **Corn resistant to rust, Puccinia Sorghi.** [Abstract.] Phytopathology **14**: 47–48. 1924.

4273. Malin, Donald F. **The evolution of breeds; an analytical study of breed building as illustrated in Shorthorn, Hereford and Aberdeen Angus cattle, Poland China and Duroc Jersey swine.** *xvi + 278 p., illus.* Wallace Publishing Co.: Des Moines, Iowa, 1923.—The author presents an analysis of the development of 5 breeds. The results obtained can be applied to any breed and it can be shown that every recognized breed has arisen from the concentration of the blood of one or a very few superior animals. In discussing the breeds the history of each is reviewed followed by a study of the blood lines of the leading sires represented at the International Live Stock Exposition from 1918 to 1922. The leading animals in the swine breeds are determined by a tabulation of the leading winners at the National Swine Shows from 1920 to 1922. The blood lines have been traced back and the foundation animals for each breed determined. Considerable space is devoted to a discussion of the merits of these foundation animals and their influence in establishing important strains within the breed. The influence of the foundation sires upon later animals is expressed in percentages of the blood of the foundation sires in the entire pedigrees of modern animals. Thus the figures give about the same information that is given by Pearl's coefficient of inbreeding. The extensive discussions are summarized in the final chapter in which it is pointed out that the most direct method of breed improvement at present lies in the concentration of the blood of the most prepotent sires.—*H. C. McPhee.*

4274. Malloch, W. S. **Experimental accuracy in fruit breeding.** Amer. Nat. **57**: 435–442. 1923.—The author calls attention to the difficulties and expense in conducting genetic investigations with pomological plants and emphasizes the importance of accuracy. Attention is called to a few striking cases of inaccuracies and carelessness in presenting data.—*Richard Wellington.*

4275. Mavor, James W. **An effect of X-rays on the linkage of Mendelian characters in the first chromosome of Drosophila.** Genetics **8**: 355–366. *2 fig.* 1923.—Frequency of (single) crossing over between loci of white and miniature in the X chromosome of *Drosophila melanogaster* was markedly reduced by X-raying the mothers (before mating). The voltage was 50,000; the dosage, expressed as the product of milliamperes times minutes, divided by the square of the number of decimeters distance from the target, was varied from 21 to 49. All dosages reduced crossing over markedly, but those over 38 caused too much infertility to be practicable; doses 35–38, those chiefly studied, reduced crossing over from the usual value of about 29% to about 10%. The effect was the same wherever total radiant energy received ("dosage") was the same, even though the time distribution of treatment was varied from 3¼ minutes to over 20 hours. Crossing over was not affected in eggs laid during the first 6 days after treatment (when infertility effect was most marked), being affected in eggs laid after that, until mothers were discarded (12–14 days after treatment). About 3,800 flies from eggs laid by treated females during the period of X-ray effectiveness were counted; the differences between the values shown in these counts and the corresponding values given in counts from untreated sisters, as well as the differences between the values in these counts and in those from eggs of the treated flies laid in the first 6 days, were all significant, being many times the probable errors of these differences. X-rays caused no permanent change in the chromosomes, as the crossing over reduction was not inherited. The 12-day continuance of effect indicates it is indirect, the X-rays probably causing a general condition that in turn affects crossing over. It is shown that this condition cannot act through any aging influence, since age does not affect crossing over in the X chromosomes (nor does any environmental agency, so far as hitherto known), and it is very improbable that the effect is produced by selective influence on viability of certain classes.—*H. J. Muller.*

4276. Meyer, Paul. **Crossing-over und Chromosomen. Ein Beitrag zur Frage des Faktorenaustauschmechanismus. [Crossing-over and chromosomes. A contribution to the question of the factor-interchange mechanism.]** Zeitschr. Indukt. Abstamm.- u. Vererb. **32**: 299–304. *6 fig.* 1923.—The author points out that if 2 crossed threads are broken by pulling, only 1 tends to break at the point of crossing. He believes crossing of chromosome threads may be an illusion, the threads really being twisted spirally in the same direction, but held apart as in models in which 2 threads, approximately parallel, are wound upon a bent glass rod of varying diameter; he endeavors to interpret the figures shown by Wenrich, etc., on this basis. The parallel hollow spirals he accounts for on the basis of a balance between chromosome attractions and a repulsion probably caused by their carrying ions of like sign; the spiral rather than straight apposition would be a position of more stable equilibrium; changes in the charges would lead to alterations in the figures. He believes that the true basis of gene interchange is not mechanical but colloidal, as in Goldschmidt's hypothesis.—*H. J. Muller.*

4277. Morant, G. M. **A first study of the Tibetan skull.** Biometrika **14**: 193–260. *14 pl., 6 fig.* 1923.—(Appendix).—From an analysis of detailed measurements of 32 Tibetan skulls it is concluded that there are in Tibet at least 2 distinct races, one closely related to Southern Chinese, Malayans and Burmese, the other showing no marked affinity with any Oriental race. The latter somewhat resembles the Fuegians and Moriori and it is tentatively suggested that these may be the widely scattered fragments of a fundamental primitive type with a long head, broad face, and rugous, massive cranium. In the 32 skulls there were 6 cases of persistent frontal sutures, 1 simple and 2 bipartite interparietal bones, and several minor variations.—*C. H. Danforth.*

4278. Munerati, O. **Sul probabile meccanismo della eredita nella odierna barbabietola da zucchero e sulle possibilita di un ulterior perfezionamenta del tipo. [On the probable mechanism of heredity in the present-day sugar-beet and the possibilities of subsequent improvement of the type.]** Ann. Botanica **16**: 122–138. 1923.—The author concludes that the

mechanism of heredity of the modern sugar beet cannot fit into any designated scheme. It is incorrect to maintain that differences in sugar content are the fluctuations within a pure line. Sugar-beet fluctuations are of 3 distinct orders: (a) those about each biotype,—median variable from situation to situation; (b) those around a complex median due to crossing of distinct biotypes; and (c) those about a "poliennale" (stable?) median. Upon completion of a long process of purification selection can operate substantially by the gradual elimination of individuals and biotypes recurrently constituted of recombinations of recessive or of undesirable factors. Not seldom perhaps the material of modern workers is so homogeneous and the biotypes composing it so harmoniously balanced that neither mass selection nor selection of progeny shows any effect. The modern sugar-beet should be defined as a complex of several biotypes maintaining in the type the condition of permanent heterozygotism necessary to escape weakening. The author repeatedly found cases in which improvement followed care and perfection in methods of cultivation.—*Helen D. Hill.*

4279. Munerati, O. **Una mancata conferma dell' assunto di Th. Ciesielski sulla trasmissione del sesso nella canapa. [A lack of confirmation of the assumption of Th. Ciesielski on the transmission of sex in hemp.]** Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. 32^2: 110–112. *1 fig.* 1923.—Experiments in pollinating hemp with fresh pollen and with old pollen showed no effect of aging the pollen on the sex of the progeny.—*F. M. Blodgett.*

4280. Perry, G. E. **Bud-grafting of Hevea brasiliensis. Anatomy of Hevea; relation between types and yield; factors in bud selection; practical budding methods.** India Rubber World **68**: 483–486. *9 fig.* 1923.—The yield of seedling rubber trees varies greatly; 4–5 pounds of dry rubber per tree annually is ordinary, but 40–50 pounds is ocasionally produced; 40% of the trees commonly produce 75 % of the crop. Preliminary tests of budding from high-yielding seedling trees have given promising results. For high yield, the phloem should show in cross section a large number of rings of latex vessels, and a great part of these should be situated far enough from the cambium to be safely reached in tapping. As sources of buds, high-yielding trees are located by monthly records of yield continued for at least a year, and bark samples from high-yielding trees are studied anatomically. Age, situation and treatment are also considered in selecting the trees to furnish bud wood. Nursery methods are described; patch budding has given the best results.—*Howard B. Frost.*

4281. Popenoe, Paul. **Rassenhygiene (Eugenik) in den Vereinigten Staaten. [Race hygiene (eugenics) in the United States.]** Arch. Rass.- u. Gesellschaftsbiol. **15**: 184–196. 1923.—The author presents a review (translated by F. Lenz) of the principal eugenic organizations in the U. S. A. and their activities; eugenic legislation, the status of public opinion, and kindred matters.—*C. H. Danforth.*

4282. Punnett, R. C. **Erfelijkheid bij Hoenders. [Heredity in poultry.]** Translated by J. P. Lotsy. *xvi + 182 p., 16 pl., 22 fig.* Martinus Nijhoff:'s -Gravenhage, 1923. [See Bot. Absts. 13, Entry 877, for abstract of original work in English.]

4283. Schaxel, Julius. **Über die Herstellung tierischer Chimaeren durch Kombination von Regenerations-Stadien und durch Pfropfsymbiose. [On the production of animal chimeras through combinations of regeneration-stages and through grafting.]** Genetica **4**: 339–363. 1922.—The author used "elementary species" of *Axolotl*, black and white, of which black is dominant in hybridization. Sectorial chimeras were produced by grafting the dorsal side of a limb of a white animal with black tissue. When this operation was performed on undifferentiated tissue (á regenerating limb bud), the resulting limb was normal in form; when differentiation had proceeded further, the chimeral limbs tended to be atypical, i.e., polydactylous. When a chimeral limb dorsally black, ventrally white was cut, regeneration resulted in reproduction of the chimera, except for a slight malformation of the digits. Periclinal chimeras were made by combining regenerating tissues (black and white) and by grafting a small white larva to a large black one. The surface of the wound grew rapidly, so that the small embryo was soon enveloped in a black integument. Histological study showed that the tissues retained their character (pigmented or non-pigmented), in spite of their abnormal positions and foreign blood supply. Mosaic chimeras were made by combining regeneration with grafting. Following reductive processes a limb with mixed tissues developed. The author con-

cludes that the characteristics of elementary species remain true to type in chimeras.—*Margaret C. Mann.*

4284. Shull, George H. **Further evidence of linkage with crossing over in Oenothera.** Genetics 8: 154–167. 1923.—Cytologists have failed to discover a mechanism in *Oenothera* which would provide for interchange of genes by the chiasmatype method. Breeding experiments show however, that linkage and crossing over do occur in species of this genus. It is predicted that further cytological studies will disclose a mechanism which accounts for the genetic facts. The following linkages and percentages of crossing over are reported: revolute leaves and red stem color, crossing over less than 1; revolute leaves and red hypanthia, 2.45 and 3.08; red hypanthia and *sulfurea* flower color, 8.7 and 6.1; *sulfurea* flower color and *nanella* stature, 4.7, 5.9, 6.7, and 9.2. Thirteen factors are now identified as belonging to the 1st linkage group. This is almost twice the haploid number of chromosomes. Crossing over must therefore take place within a single chromosome pair. Apparent cohesion of non-homologous chromosomes does not afford an adequate explanation.—*P. C. Mangelsdorf.*

4285. Sirks, M. J. **Die Verschiebung genotypischer Verhältniszahlen innerhalb Populationen laut mathematische Berechnung und experimenteller Prüfung. [Shifting of genetypic proportion numbers within populations according to mathematical calculation and experimental test.]** Mededeel. Landbouwhoogeschool Wageningen 26^4: 1–40. *13 fig.* 1923.—The problem of shifting of the genotypic proportions in populations which are based upon Mendelian segregation have been studied only from a mathematical standpoint. The writer studied especially (1) monohybrids and their progeny under continuous selection of the dominant A-type and the elimination of the segregated recessive *a*-individuals; (2) monohybrids and their progeny of the F_1 without any selection; (3) dihybrids and their progeny with continuous selection of double dominants, namely *AB* plants, whereas segregated *Ab*, *aB* and *ab* individuals were not considered; (4) dihybrids and the progeny without selection.—*J. C. Th. Uphof.*

4286. Skalinska, Marie. **Recherches sur la sélection des bourgeons chez une race polymorphe du Petuna et le problème de la production de nouvelles variétés. [Bud selection in a polymorphic race of Petunia and the problem of the production of new varieties.]** Compt. Rend. Soc. Biol. Paris. 89: 1367–1369. 1923.—Varieties of *Petunia violacea* stabilized by asexual multiplication do not show hereditary differences, i.e., they are not equivalent to elementary species.—*Oran Raber.*

4287. Smith, Ralph W., L. R. Waldron, and J. Allen Clark. **Improvement of Kubanka durum wheat by pure-line selections.** U. S. Dept. Agric. Bull. 1192. *14 p., 4 fig.* 1923.—This report deals with pure-line selections of Kubanka (S. P. I. No. 5639, C. I. No. 1440) introduced from Uralsk, Russia, in 1900 by M. A. Carleton. Of 143 selections originally made in 1915, all but 10 were discarded during selection; they were grown chiefly at the Dickinson and Fargo, North Dakota stations in nursery rows and later in plats under comparable experimental conditions. "Nodak," the name given to Selection No. 98, proved its superiority in many respects over the other selections and the standard local varieties; it was increased for commercial distribution. At Dickinson, 5-year averages showed that it ranked 1st as to yield and crude protein; ranked high as to rust resistance, semolina qualities, and color score; it was, however, slightly below average in loaf volume, weak in straw, and above average in flour yield.—*S. Boshnakian.*

4288. Steffan. **Die Bedeutung der Blutuntersuchung für die Bluttransfusion und die Rassenforschung. [The significance of investigations on blood for blood transfusion and racial studies.]** Arch. Rass.- u. Gesellschaftsbiol. 15: 137–150. 1923.—This paper is chiefly a review of previous work upon the inheritance and racial distribution of blood agglutinins differentiating human beings. The author attempts to interpret all peoples as being derived from mixtures in varying proportions of 2 original races, Western and Eastern, the 1st of which possessed 1 of the 2 common agglutinins, and the 2nd the other agglutinin. They are supposed to have developed these different agglutinins through the pressure of unlike environments. Racial origins would thus be solved by agglutinin statistics.—*H. J. Muller.*

4289. Stuckey, H. P. **The investigational work with pears at the Georgia experimental station.** Rept. Iowa State Hort. Soc. 57: 169–172. 1922.—In a varietal test of pear varieties the so-called "Pineapple" pear was found to be the most resistant to blight. The history and description of this pear are given.—*Richard Wellington.*

4290. Taliaferro, W. H., and J. G. Huck. **The inheritance of sickle-cell anaemia in man.** Genetics 8: 594–598. 1923.—Sickle-cell anaemia is a comparatively rare disease, so far described only in negroes and mulattoes. Two genealogical charts are presented which indicate that the disease is inherited in a definite manner. An analysis of the data leads the author to the conclusion that sickle-cell anaemia behaves as a single Mendelian character which is dominant over the normal condition. The assumption that the character is sex-linked, and several other possible assumptions are discussed and found not to fit the case.—*Dorothy I. Neff.*

4291. Tedin, Hans, and Olof Tedin. **Contributions to the genetics of Pisum. III. Internode length, stem thickness and place of the first flower.** Hereditas 4: 351–362. 1923.—This is a preliminary report on 5 crosses between 6 lines of peas. Monohybrid segregation occurred in crosses between races with short and with long internodes. The influence of other factors was suggested, however, by the fact that the extremes of the F_2 were beyond those of the parents. No significant correlation was found between stem thickness and internode length. Monohybrid segregation was indicated in crosses between high 1st flowers and low 1st flowers (number of sterile nodes). No break was found in the previously reported positive correlation between the number of sterile nodes and lateness of flowering. A significant positive correlation was found between thickness of stem and number of sterile nodes.—*Edgar Anderson.*

4292. Thompson, Warren S. [Rev. of: East E. M. **Mankind at the cross roads.** *viii + 360 p.* Chas. Scribner & Son: New York, 1923.] Science 58: 445–446. 1923.

4293. Toole, William, Sr. **Variations in native trees, shrubs and herbaceous plants.** Ann. Rept. Wisconsin State Hort. Soc. 52: 87–94. 1923.—This is a general discussion of variations occurring in native trees, shrubs, and herbaceous plants of Wisconsin, and of methods of selection and propagation leading to the production of more desirable varieties.—*Charlotte Elliott.*

4294. Valleau, W. D. **Studies on seed infection, ear types, and yield, and the isolation of strains of corn showing specific disease reactions in the germinator.** [Abstract.] Phytopathology 14: 46–47. 1924.

4295. Vries, Hugo de. **Oenothera Lamarckiana mut. perennis.** Flora 116: 336–345. 1923.—In the progeny of 60 plants of a cross of *O. blandina* and *O. simplex* there appeared 2 semigigas mutants. One of these produced lateral rosettes and was found to be perennial. This new type has been propagated by vegetative means. It produces only sterile pollen and is partially sterile in crosses although a small amount of seed is produced when pollen from certain of the other mutants is applied. When progeny of these crosses were grown, many of the familiar types were recovered but many new combinations also appeared. Its breeding behavior indicates its origin as the result of recombination of factors carried by the parent mutants. —*P. C. Mangelsdorf.*

4296. Vries, Hugo de. **Über Sesquiplex-Mutanten von Oenothera Lamarckiana.** [**Sesquiplex mutations in Oenothera Lamarckiana.**] Zeitschr. Bot. 15: 368–408. 1923.—Sesquiplex mutations is the term adopted for those which produce 2 types of ♀ gametes and only 1 type of functional ♂ gamete. They may be represented by the general formula (A + B) × B in which A is the mutant gamete and B the one which has come without change from the parent species. A is associated with an androlethal which renders functionless all of the A pollen grains. B is linked with a gynolethal. Seed resulting from a B × B fertilization are therefore empty and do not grow. On account of the action of these lethals the sesquiplex mutations breed true. A number of mutant types of *Oenothera* have been investigated and found to be of the sesquiplex type. In the formula the B may represent either a *velutina* gamete or a *laeta* gamete. Depending upon which of these 2 is present the mutations fall into 2 groups. One has the general formula (mutant + *velutina*) × *velutina;* the other (mutant + *laeta*) × *laeta.*—*P. C. Mangelsdorf.*

4297. Weiss, Freeman, and C. R. Orton. **Further results in the inheritance of immunity to potato wart.** [Abstract.] Phytopathology 14: 59. 1924.

4298. Yule, G. Udny. **The progeny in generations F_{12} and F_{17} of a cross between a yellow-wrinkled and a green-round seeded pea; a report on data afforded by experiments initiated by**

the late A. D. Darbishire, M. A., in 1905, and conducted by him until his death in 1915. Jour. Genetics 13: 255–331. *8 fig.* 1923.—This exhaustive analysis attempts to evaluate the sufficiency of the Mendelian law for the data concerned.—The 4 types of plants: dihybrids for shape and color, hybrids for shape and for color, and pure dominants, do not occur according to Mendelian expectation but vary from the 6 generations together to such an extent that equal divergence would be found only once in about 15,000 trials ($P = 0.00007$). Differential death rates can not be held mainly accountable.—Divergence from expectation of the proportions of seed on each type of plant, using each generation as a unit, for the total number of generations was so marked that equal divergence would be expected only in 1 case in 25,000. In 1 generation, with 14,080 seed, the divergence was even very decidedly greater ($P = 3.5 \times 10^{-13+}$). It is pointed out that Mendel's original results with peas, according so well with theory, would diverge as greatly as these at hand were the numbers involved as great. It seems necessary to postulate the inadequacy of the Mendelian hypothesis.—The proportions of seed, with regard to color and shape upon individual plants of each type, were studied. Distributions of plants were secured, with reference to expected percentages of various seed types. Standard deviations of these distributions were more, in all cases but 1, than the standard deviations of sampling. Normal curves were fitted to the various distributions. In case of dihybrid seed, the fit, judged by successive runs of excess and defect, was so poor as to be judged impossible. The 2, and even 3, components into which some of the curves were broken, indicated serious difficulties, among which were certain suggested but quite puzzling 3:1 ratios, indicating a complex instead of a simple mechanism.—Plants were studied with respect to proportions of the 4 seed types and 22 abnormals were found ($P = 0.046$ or more). The abnormal plants showed certain group relationships, probably heritable. Out of 31 families of crop *M* containing 11 abnormal plants, ascendants of 29 were traced and data combined. Of these, 16 showed close correspondence to expectations, while 13 showed marked departures but forming 2 groups each with distinct evidences of homogeneity.—When single characters were considered rather than combinations, i.e., proportion of round or of yellow seed, it was found very probable that the separate lines or families were not uniformly Mendelian nor did they form a homogeneous group. Studies were made of the distribution of the 4 types of seed in each pod in regard to Mendelian expectation. Nothing indicating abnormality was found, which was rather to be expected in view of the great influence of pure chance when dealing with small numbers of peas per pod.—The article furnishes much illustrative material for determining values of *P*, including certain novel ones.—*L. R. Waldron.*

HORTICULTURE

J. H. Gourley, *Editor*

John Bushnell, *Assistant Editor*

(See also in this issue Entries 4075, 4085, 4086, 4089, 4122, 4237, 4245, 4252, 4274, 4280, 4289, 4293, 4344, 4491, 4559, 4572)

FRUITS AND GENERAL HORTICULTURE

4299. Bally, W. **Over productionverhooging van rubberondernemingen.** [Increased production on rubber estates.] Mededeel. Proefsta. Malang 38. *30–50.* 1922.—The writer discusses the problem from 2 angles: (1) how can rubber estates as they are now constituted be made to yield larger products; (2) how can new and superior plantings be planned which will insure better production results? Under the 1st question the writer discusses the influence of cultural methods on production; the influence of the tapping system and frequency of tapping on production, and the influence that thinning on the basis of production measurements, and latex vessel examination have on production results. Under the 2nd question are considered the offspring from selected high-yielding mother trees, offspring which have originated through seed and through vegetative means.—*Cecil Yampolsky.*

4300. Beckwith, Charles S. **Investigations of cranberry problems.** New Jersey Agric. Exp. Sta. Ann. Rept. 43: 449–465. 1921/22 [1924].—Results of fertilizer tests with cranberries are discussed. Data are presented that lime is beneficial when applied to good cranberry land; the benefits are not apparent until 2 years after the application is made on savanna

bottom and 3 years after on mud bottom. Spray machinery for cranberries is discussed. [See also Bot. Absts. 11, Entry 2507; 12, Entry 5643.]—*Wm. H. Martin.*

4301. Blake, M. A. **Relative time of blooming of fruits at College Farm.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 88–89. *1 pl.* 1921/22 [1924].—Time of appearance of first bloom upon certain fruit at New Brunswick, New Jersey, are given for the years 1914, 16, 21, and 22.—*Wm. H. Martin.*

4302. Blake, M. A. **Relative time of blooming of various trees and ornamentals at College Farm.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 89–93. 1921/22 [1924].—The 1922 blooming dates are given of a number of varieties of apples, pears, and plums and also of a number of ornamental trees and shrubs.—*Wm. H. Martin.*

4303. Blake, M. A., and C. H. Connors. **Some studies of different forms of summer pruning of peaches.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 94–97. 1921/22 [1924].—Check trees made the largest total increase in diameter during the season. Those with the side branches cut back or thinned made the next largest gain, while the trees with the side branches removed showed decidedly the poorest gain, with the exception of girdled trees.—*Wm. H. Martin.*

4304. Boyes, D. **Notes on the characters of apple tree shoots.** Jour. Pomology and Hort. Sci. **3**: 36–46. *Fig. 10–18.* 1922.—This paper deals with the morphology and behavior of different types of shoots produced on apple trees, and is intended as an introduction to, and a definition of terms for, a more detailed consideration of growth response to pruning. The author explains such French terms as "dard," "lambourde," and "brindille," which are considered to be more distinctive and hence more desirable than the English and American terminology. The different types of buds and of twig growth are described in detail.—*L. H. MacDaniels.*

4305. Bunyard, Edward A. **An introductory note on the history and development of the raspberry.** Jour. Pomology and Hort. Sci. **3**: 5–6. 1922.—An account is given of the history of the European red raspberry (*Rubus idaeus* Linn.), referring especially to accounts of it in classical writings.—*L. H. MacDaniels.*

4306. Connors, C. H. **Fruit setting on J. H. Hale peach.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 102–104. 1921/22 [1924].—Breeding experiments indicate that the uneven setting of fruit on this variety is due to lack of pollen. It is recommended that when this variety is planted facilities for cross-pollination should be provided.—*Wm. H. Martin.*

4307. Davies, Samuel Henry. **Cocoa [Theobroma Cacao] cultivation in the British Tropical Colonies.** Jour. Roy. Soc. Arts. **72**: 158–168. 1924.

4308. Enfer, V. **Caprices du surgreffage, greffes qui tuent. [Peculiarities of top grafting, grafts which kill.]** Rev. Hort. **95**: 371–373. 1923.—Cases are cited, mainly of pears, in many of which the scion seemed to grow very poorly, or to exercise a harmful influence upon the stock.—*E. J. Kraus.*

4309. Grubb, N. H. **Commercial raspberries and their classification.** Jour. Pomolog and Hort. Sci. **3**: 11–35. *Fig. 1–9.* 1922.—It has previously been shown that in England there is great confusion in the nomenclature of red raspberry varieties. A 4-year yield test of 10 varieties showed a variation of from 100, signifying the best, to 33 in case of the poorest. The correction identification of varieties is therefore very important. It was found possible to make a key to a considerable number of varieties based on the pubescence of the tips of the young canes, the color of the spines and canes, and other mostly vegetative characters. Detailed descriptions of 40 varieties are given.—*L. H. MacDaniels.*

4310. Grubb, N. H., and G. S. Peren. **A note on the impurity of raspberry stocks.** Jour. Pomology and Hort. Sci. **3**: 7–10. 1922.—A study of red raspberry (*Rubus idaeus* Linn.) varieties at the Long Ashton and East Malling Research Stations showed that there was great confusion in varietal nomenclature, both in nursery stock and in commercial plantations in England. In some cases as many as 8 varieties were found growing under the same name. Among the causes contributing to this confusion are (1) transfer of one varietal name to another variety and propagating it under the new name; (2) occurrence of seedlings from fallen fruit in the row; and (3) "bud sporting" of varieties.—*L. H. MacDaniels.*

4311. Heppner, Myer J. **A study of deciduous fruit tree rootstocks with special reference to their identification.** California Agric. Exp. Sta. Tech. Paper 6. *36 p., 6 pl.* 1923.—The material used in this study included apricot, almond, plum, cherry, peach, pear, apple, and quince roots. Both the gross morphological differences and the microscopic differences in the root structure were noted. Although the roots of one species may seem indistinguishable from those of another, a histological study shows marked differences. From the results of his study, the author has constructed a key for the identification of the rootstocks studied. There is a survey and discussion of the literature of the subject.—*Margaret Buvens.*

4312. Heusser, K. **Proeftappingen en Bastonderzoek in een uitgeselekteerd Zaad geplanten Heveatuin. [Tapping tests and bast examination of Hevea plants from selected seed.]** Mededeel. Alg. Proefsta. A. V. R. O. S. Rubberser. 32. *29 p., 8 fig.* 1921. [Reprinted from Arch. Rubbercult. 5: No. 6. 1921.]—Illegitimate seed from 4 high yielding and vigorous mother trees (7 years old) were sown and from these 100 trees were selected for later observation of latex yield. The average daily yield over a period of 13 months for the mother trees was recorded; also the number of latex-vessel rows per radial unit of bast. During 2 years the average production of the trees increased from 2.17 to 11.26 gm. per day. On the basis of the average daily yield of the entire plantation, the selected daughter trees showed an increase of 75% over the best average yield of all trees of the plantation. The offspring of the 4 mother trees showed great variation in production. Curves show relative production of the 100 selected trees and of 100 trees of unknown ancestry.—Observations were made on increase in circumference of the selected trees from the 4th to 6th years. During 2 years there was an average increase of 25.46 cm. The coefficient of correlation between circumference and production Sept., 1920, was 0.336; and between increase in thickness and production, 0.263. At the end of 2 years' observation the average thickness of the bast was 7.3 mm., an average increase of 0.71 mm. in 2 years. The average increase in the rows of the latex vessels for all selected trees for the period was 4.67.—Correlation between latex row number and rubber production for 4-year-old trees was 0.426 ± 0.082, for 5-year-old trees 0.535 ± 0.071. The author maintains that a correlation of 0.5 is too low upon which to base a practical method of thinning out trees. This criticism is especially applicable to a practice that would thin out young trees: $\frac{\text{production of 4 year Heveas}}{\text{production of 6 year Heveas}} = 0.641 \pm 0.59$; $\frac{\text{number of latex rows of 4 year Heveas}}{\text{production of 6 year Heveas}}$ $= 0.322 \pm 0.089$. [With summary in English.]—*Cecil Yampolsky.*

4313. Hill, A. W. **Recovery of Hevea trees after ringing.** Kew Bull. 1922: 91–94. 1 *fig.* 1922.—In the Agege plantation, Nigeria, the Hevea trees were ringed in order to thin the stand. Callous growth extending downward from the cortical tissues above the ring met and joined the cortical tissues below, thus bridging the cut. The ringing had no apparent effect on the top growth. Wounds on the younger trees healed rapidly and completely; on older trees healing was slower and often less complete.—*T. J. Fitzpatrick.*

4314. Hooker, Henry D., Jr. **Peach culture in Missouri.** Missouri Agric. Exp. Sta. Bull. 207. *14 p., 12 figs.* 1923.—The relation of winter injury to peach culture in Missouri is emphasized. It is pointed out that pruning, cultivation, fertilizer, and crop thinning increase hardiness to late winter injury. Reasons are given for delaying pruning until the trees are in bloom. The pruning recommended is a combination of thinning out and heading back. When pruning cannot be so delayed a winter heading followed by a summer thinning of the new growth is recommended. These methods of pruning are shown to favor the development of the greatest number of hardy buds. Data are given showing the value of delaying fertilizer applications until danger from late frosts has passed. Directions for spraying and for the control of peach borers are appended.—*Author.*

4315. Jong, A. W. K. de. **Intensivering van het bedrijf der meerjarigecultures. [Intensive cultivation of perennial crops.]** Mededeel Alg. Proefsta. A. V. R. O. S. Alg. Ser. 17. *12 p.* 1923.—By intensive cultivation the writer means that on a given estate more capital and labor and less ground are used. Economic and natural factors are concerned in intensive cultivation. Because of the nature of the competition and because of the danger attending overproduction when only 1 crop is grown by many planters, the cultures on an estate should be distributed so that the economic results depend on a number of plant products. On

Sumatra's east coast 80% of the perennial plants are Hevea and 15% coco-nut, oil palm, and tea, with lesser quantities of Agave, gutta percha, quinine, cocoa, etc. Experimental trials of the plants grown in small quantities to determine their place on large estates is desirable. In Sumatra coffee has been planted as a catch crop between Hevea and oil palm, but the presence of the coffee berry beetle makes coffee planting less desirable. In Java sereh grass (yielding citronella oil) is successful. Cocoa is also grown as a catch crop. The writer has demonstrated that the use of fertilizers with Hevea in Java has given an increased latex yield of 30%. With reference to tapping methods and systems in Hevea the most economical way may be to alternate tapping days with rest days, and increasing daily the length of the cut.—*Cecil Yampolsky.*

4316. Maas, J. G. J. A. **Verslag van een uitdunproef op de onderneming Tanah Besih [Report on a thinning out experiment on the Tanah Besih estate.]** Mededeel. Alg. Proefsta. A. V. R. O. S. Rubberser. 34. *4 p.* 1922. [Reprinted from: Arch. Rubbercult. 6[6]: June, 1922.]—Three 5-acre blocks of 6-year old rubber trees were kept under observation to determine yield per acre after thinning. The blocks A, B, and C contained respectively 126, 113, and 101 trees to the acre; 116 of block A and all of B and C were in tap. A remained as a check and B and C were thinned to 90 and 60 trees to the acre. On the basis of production experiments and the number of trees present before the experiment was started the writer gives the ratios of A:B:C equal to 100: ± 92: ± 94. Thinning was done arbitrarily and was therefore not selective. The results are given after 6 years measurements (1916–1922). B and C outyielded A. The conclusion drawn is that on the east coast of Sumatra 100–120 trees to the acre in the 5th year can be reduced to 60 in the 10th and 12th years.—*Cecil Yampolsky.*

4317. Maas, J. G. J. A., en A. A. L. Rutgers. **Grondbewerking in Heveatuinen. [Cultivation in Hevea plantations.]** Mededeel. Alg. Proefsta. A. V. R. O. S. Rubberser. 36. *14 p.* 1922. [Reprinted from: Arch. Rubercult. 6[7]: July, 1922.]—Production measurements taken from 10 4-acre plots on the Tandjong Merah Estate show no immediate striking differences between cultivated and uncultivated plots. During one period the production of the cultivated plots was 90% lower than of the uncultivated ones.—Production figures from whole estates where cultivation and non-cultivation were practiced show that parallel increases of production occurred in neighboring estates irrespective of whether the ground was cultivated or covered with grass.—*Cecil Yampolsky.*

4318. Memmler. **Die Kultur des Apfelbaumes in Topfe. [Apple growing in pots.]** Gartenwelt 43: 190–191. 1919.—A general description of growing apple trees in pots for forcing is presented. Best varieties for this purpose are Weisser Winterkalvill, Cellini, Königlicher Kurzstiele, Eweapfel, Manksapfel and Weisser Klarapfel. The Paradise is in this case more suitable as stock than Doucin apple. In October 1-year-old grafted trees are potted. The following year the trees are pruned. Such plants may be forced.—*J. C. Th. Uphof.*

4319. Overholser, E. L., and W. V. Cruess. **A study of the darkening of apple tissue.** California Agric. Exp. Tech. Paper 7. *40 p.* 1923.—This study was conducted to obtain data concerning the chemical changes in apples exposed to sulphur fumes during the process of drying, with the view of suggesting other means of preventing the darkening of the tissue. The brown color is believed to be caused by the oxidation of tannin, the oxidizing system consisting of a peroxidase and an organic peroxide. A preliminary study was made of the browning process, and of the nature of the oxidizing system. Tests were carried out to determine the effect on the oxidizing enzymes of the following factors: temperature, various gases, electrolysis, neutral salts, alkalies, acids other than sulfurous acid, and sulfurous acid. Laboratory tests showed that 3–5% NaCl solutions gave a satisfactory product although the color was not so light as that of the sulfured apples. A bibliography is given.—*Margaret Buvens.*

4320. Ravaz, L., G. Verge, H. Lagatu, et L. Maume. **Influence de la potasse sur la santé de la vigne et sur la qualité des vins. [The influence of potassium on the health of the grape vine and on the quality of wines.]** Ann. Ecole Nation. Agric. Montpellier 17: 280–306. *Pl. 1–2.* 1920.—Working with the hybrid grape "Grand Noir" the authors found that potassium improves the quality and, if the vines are properly pruned, also increases the quantity of the fruit.—*F. F. Halma.*

4321. Swartwout, H. G. **Grape growing in Missouri.** Missouri Agric. Exp. Sta. Bull. 208. *34 p., 19 fig.* 1924.—This gives detailed cultural directions for the growing of grapes under Missouri conditions.—*L. J. Stadler.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

4322. Connors, C. H. **Lime studies with hydrangeas.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 107–109. *3 pl.* 1921, 22 [1924].—The results of experiments show that the pink color in hydrangeas may be maintained by keeping the soil near the neutral point with lime. Amounts of ground limestone up to 10,000 pounds per acre appear to be safe, and even beneficial to the growth of plants.—*Wm. H. Martin.*

4323. Durand, J. **Nandina domestica Thunb.** Rev. Hort. 95: 340. *1 pl. (col.).* 1923.

4324. Fondard, L. **Experiences de fumure sur la lavande.** [**Fertilizer experiments on lavender.**] Compt. Rend. Acad. Agric. France 1920: 788–793. 1920.—Each plot contained 1,481 stalks, spaced 1.5 m. The plots were treated as follows: (1) check; (2) 28 kgm. acid phosphate; (3) 12 kgm. $NaNO_3$; (4) 28 kgm. acid phosphate and 12 kgm. $NaNO_3$. These yielded flowers as follows, calling the yield of the check plot 100: (2) 108, (3) 206, (4) 215.4. The yield of oil was, on the same basis: (2) 116, (3) 225, (4) 240,—i.e., the yield of oil per kgm. of flowers was increased by the fertilizer in addition to the increased yield of flowers. Experiments the following year confirmed the results.—*Ernst A. Bessey.*

4325. François, E. **Un beau palmier de Madagascar.** [**A beautiful palm from Madagascar.**] Rev. Hort. 95: 292–293. *Fig. 89.* 1923.—*Chrysalidocarpus Baroni* is described.—*E. J. Kraus.*

4326. Lamproy, E. **Chrysanthèmes simples a fleurs d'Anthémis.** [**Anthemis-flowered single chrysanthemums.**] Rev. Hort. 95: 301. *Fig. 91.* 1923.

4327. Laplace, F. **La Rose Toison D'Or.** Rev. Hort. 95: 318. *1 col. pl.* 1923.—This is regarded one of the best yellow varieties.—*E. J. Kraus.*

4328. Lehaie, J. H. de. **Phyllostachys aurea A. et. Ch. Rivière.** Rev. Hort. 95: 271–272. 1923.—This plant is probably a Chinese horticultural variety of a species unknown in Europe. *Sasa paniculata* forma *nebulosa* Mak. and Shib. is relatively hardy.—*E. J. Kraus.*

4329. Marcoz, A. **Cattleya souvenir de Madame A. Leclerc.** Rev. Hort. 95: 298. *1 col. pl.* 1923.

4330. Mottet, S. **Pinus leucodermis Ant.** Rev. Hort. 95: 332–334. *Fig. 100–101.* 1923.

4331. Occhialini, O., et G. Mariotte. **Deux nouvelles variétés de Gardénia.** [**Two new varieties of Gardenia.**] Rev. Hort. 95: 274–276. *Fig. 84–85.* 1923.—Description and origin of the varieties Regina Elena di Savoia and Prof. Angiolo Pucci are given.—*E. J. Kraus.*

4332. Rother, Wilhelm Otto. **Praktischer Leitfaden für die Anzucht und Pflege der Kakteen und Phyllokakteen.** [Practical directions for the growing and care of Cactaceae and Phyllocactaceae.] *4th rev. ed., viii + 159 p., illus.* Trowitsch & Sohn: Frankfort a/O, 1921.

4333. Rother, Wilhelm Otto. **Praktischer Leitfaden für die Anzucht und Pflege der Kakteen und anderer Sukkulenten.** [Practical directions for the growing and care of Cactaceae and other succulents.] *5th ed.*, Alwin Berger, Editor. *viii + 203 p., illus.* Trowitsch & Sohn: Frankfort a/O, 1923.

4334. Tesnier, F. **Distribution géographique du genre Iris.** [Geographic distribution of the genus Iris.] Rev. Hort. 95: 296–298. 1923.

4335. Tesnier, F. **Les éphémérides de l'Iris.** [A chronology of the Iris.] Rev. Hort. 95: 341–342. 1923.

VEGETABLE CULTURE

4336. App, Frank, and Allen G. Waller. **Costs, profits and practices of the can-house tomato industry in New Jersey.** New Jersey Agric. Exp. Sta. Bull. 353. *85 p., 17 fig.* 1921.—Following a brief summary of the status of the tomato industry in the U. S. A. the authors discuss the methods followed in growing can-house tomatoes in New Jersey. Cost-of-production figures are given for 1918–20.—*Wm. H. Martin.*

4337. Brooks, G. B. **The sweet potato (Ipomoea Batatas).** Queensland Agric. Jour. 20: 124-148. *Pl. 1–15.* 1923.—The origin, varieties, propagation, classification, distinguishing characteristics, and the propagation of new varieties are treated. The leaves of 48 and the tubers of 64 varieties are illustrated in color.—*W. D. Francis.*

4338. Hoover, L. G. **The chayote: its culture and uses.** U. S. Dept. Agric. Dept. Circ. 286. *11 p., 4 pl., 4 fig.* 1923.—This immigrant from Mexico, Central America, and the West Indies, where it is of ancient cultivation, is a cucurbit with edible fruits and tubers. The following are discussed: native home, adaptability for cultivation in southern U. S. A., varieties, cultural directions, uses, receipts, and market possibilities. Diseases and insect pests are mentioned.—*L. R. Hesler.*

4339. Poole, R. F., and C. W. Fant. **Further study of the relation of various fertilizer mixtures to the growth of celery in muck soil.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 395–399. *1 fig.* 1921/22 [1924].—The results of a series of fertilizer tests with celery grown in 2-gallon pots indicate that a 6-6-4 or 4-8-4 fertilizer mixture applied at the rate of 1,600–2,000 pounds per acre should give good results on muck soils.—*Wm. H. Martin.*

4340. Rosa, J. T. **Controlling soil moisture for vegetable crops in Missouri.** Missouri Agric. Exp. Sta. Bull. 204. *8 p., 3 fig.* 1923.—Increased yields from irrigation are said to justify the use of overhead irrigation for intensive cultivation of valuable crops. The proportion of early maturing fruit was not affected by irrigation, but susceptibility to disease was increased. Mulching gave smaller increases which appeared the latter part of the season. The effects of the mulch are attributed to the reduction of soil temperature and decrease in fluctuations of the soil moisture content.—*L. J. Stadler.*

4341. Schermerhorn, L. G. **Report of the department of vegetable gardening.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 110–118. 1921/22 [1924].—In a test to determine the relative value of transplanted and seedling tomato plants, the former outyielded the latter. In a fertilizer triangle experiment with tomatoes highest yields were obtained on a plot receiving a 4-6-6 mixture and lowest where a 12-2-2 mixture was applied. In another test, tomatoes with a complete fertilizer outyielded those with incomplete mixtures. In a fertilizer triangle experiment with sweet potatoes, highest yields resulted on plots receiving 1,000 pounds of a 4-6-6 mixture. With each increase in nitrogen applied there was a decrease in yield, lowest yields being recorded on those plots receiving a 12-2-2 mixture.—*Wm. H. Martin.*

HORTICULTURAL PRODUCTS

4342. Denton, Minna C., Ruth Johnstin, and Fanny Walker Yeatman. **Homemade apple and citrus pectin extracts and their use in jelly making.** U. S. Dept. Agric. Dept. Circ. 254. *11 p.* 1923.

4343. Krug, O., und G. Fiesselmann. **Die 1922-er Weinernte in der Pfalz.** [**Vintage of 1922 in the Palatinate.**] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 45: 115–120. 1923.

MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

(See also in this issue Entries 4140, 4208, 4230, 4242, 4280, 4311, 4312, 4608)

4344. Blauw, A. H. **De periodieke dikte-toename van der bol den hyacinthen.** [**The periodic increase in thickness of hyacinth bulbs.**] Mededeel. Landbouwhoogeschool Wageningen 27²: 1–103. *38 fig.* 1923.—A study was made of the growth during 5 years of bulbs obtained by "scooping" old bulbs. These vary greatly in size. The 1st leaf-series with which the building up of the bulb begins consists as a rule of 2 or 3 scale leaves and usually 1 foliage leaf (sometimes 2), the basal parts of which become scales. By December of the 1st year the 2nd leaf-series appears within the 1st foliage leaf and formed by the same growing-point. In early years the scales are often closed all around at the base, but after the 3rd leaf-series all of the scales are open. The 2nd leaf-series usually consists of 2 scale leaves and 3 foliage leaves; the 3rd of 2 scale leaves and 4 or 5 foliage leaves. The growing-point begins to produce

inflorescences about the end of July and a new lateral growing-point originates in the axil of the innermost young foliage leaf. The 3 leaf-series form a continuous spiral. It often happens that after the formation of the 1st scale leaf of the 3rd series in October of the 2nd year, the growing-point forms a small raceme, which perishes. The formation of later leaf-series is described. The author states that (1) the phyllotaxy corresponds to that of the principal series; (2) successive leaf-series proceed in the same direction; (3) the spiral of the leaf sequence may turn to the right or to the left. While the formation of new leaves from the central growing-point is going steadily on, reduced only by the low winter temperatures, the scales on the outside are being used up. Increase in bulb circumference is given for different months and years. The scale leaves and the basal parts of the foliage leaves of full-grown hyacinths remain alive and capable of growth for 3 or 4 years. In the assimilation period they annually show a periodic growth, especially in breadth. The thickness of the scales does not increase in later years. The disc or stem of the bulb annually shows a kind of secondary growth from April till the end of June. "Queen of the Blues" was the variety studied.—*J. C. Th. Uphof.*

4345. Bruyne, C. de. **Over het gelijktijdig voorkomen van "inwendige haren" and diaphragma's bij de Nymphaeaceen. [The simultaneous occurrence of "internal hairs" and diaphragms in the Nymphaeaceae.]** Natuurwetenschapp. Tijdschr. **5**: 101–105. *3 fig.* 1923.—At certain points in the air channels, at least in the roots, occur cellular partitions. The author questions the view of Haberlandt that this tissue serves as mechanical support. In young air chambers of *Nuphar* swellings originate in which rapid cell division takes place, producing dichotomous or irregular branching, and closing the channels. Drops of slimy substance are secreted. The arms of the star-shaped idioblasts seem to serve as supports for these partitions.—*J. C. Th. Uphof.*

4346. Cammerloher, H. **Unfruchtbarkeit als Folge vorübergehender Kleistopetalie bei Aristolochia arborea. [Sterility in Aristolchia arborea.]** Ber. Deutsch. Bot. Ges. **40**: 385–393. *Fig. 1–8.* 1922.—It had previously been thought that the failure of *Aristolochia arborea* (a native of Mexico) to produce fruits, when grown in the Botanical Garden of Buitenzorg, Java, was due to a change in climatic conditions or the absence of the insects necessary for pollination. The author found that open flowers were visited frequently by insects and ants, but the opening is delayed until after the stigmas have dried up. The pollen does not mature until about the time the flower opens. Thus, neither self pollination before the flowers open nor cross pollination after they open is possible. By artificially pollinating unopened flowers when the pistil is receptive the author secured abundant setting of fruits.—*W. C. Muenscher.*

4347. Chauveaud, G. **Dans le monde des plantes vasculaires le type unicotylé serait en voie d'acquérir la prépondérance. [The unicotyl type is on the way to acquiring preponderance in the world of vascular plants.]** Rev. Gén. Bot. **35**: 440–454. 1923.—The dicotyledons are on the way to lose the preponderance which they held among the angiosperms during the tertiary. Those of their species which have acquired adventitious roots tend to propagate themselves directly as plants of the unicotyl type. But it is especially this last type which should preponderate today and invade, with the Cyperaceae and the Gramineae, the greater part of the surface of the earth.—*J. C. Gilman.*

4348. Cordemoy, J. de. **Contribution a l'etude de la morphologie, de l'anatomie comparée, de la phylogénie et de la biogéographie des Casuarinacées. [Contribution to the study of the morphology, comparative anatomy, phylogeny and biogeography of the Casuarinaceae.]** Rev. Gén. Bot. **35**: 71–91, 127–140, 186–195, 227–243, 292–303, 335–347, 399–413. 1923.—The Casuarinaceae have their center of development in Australia, and therefore make up the most characteristic vegetation of the flora of that continent, which possesses a relatively dry climate. The Australian *Casuarina*, an archaic plant form, a primitive angiosperm, which has been truly arrested in its evolution by isolation, is, therefore, essentially xerophilic. It has cylindric branches with foliar verticils generally composed of numerous concrescent leaves varying in number from 4 to 20.—From its center of origin, *Casuarina* has migrated to regions of greater humidity and heat, tropical or equatorial, such as New Caledonia and the islands of the Asiatic archipelago; and then, by adaptation to the new

conditions of environment, new forms have arisen, characterized by the reduction of the number of concrescent leaves and more or less marked attenuation of the xerophilic primitive type, as is illustrated by New Caledonian species with tetragonal branches having foliar verticils constantly made up of 4 leaves, in which the entire morphology and anatomy reveals the influence of the humidity of the air. The distribution of *Casuarina* of the tetragonous type is limited.—Of all the species of this genus which appear to originate in Australia, only *Casuarina equisetifolia* actually possesses an extended distribution, comprising all the lands about the Indian Ocean. A tree of the coast and bank, essentially a psammophilic species, prospering particularly in the white madreporic sands of the coral islands or the adjacent shores of the coral reefs, it is dispersed to great distances by its cones, which are carried far by sea currents. It is implanted spontaneously, and becomes naturalized on all the coasts. It is useful because of the many services it renders in inter-tropical countries, in reforestation of the coast, in fixation of the dunes, or by reason of the good quality of its wood for fuel or timber. It should extend its distribution by the intervention of man and the progress of colonization. Introduced in this way, it naturalizes itself rapidly where the conditions of environment and soil are favorable to its growth and where without quitting the littoral zone it may find free space for growth.—*J. C. Gilman.*

4349. Gleisberg, W. **Vergleichend-anatomische Untersuchung des Blattes der Vaccinium Oxycoccus Typen. [Comparative anatomical investigation of Vaccinium Oxycoccus leaves.]** Ber. Deutsch. Bot. Ges. **40:** 139–147. *Fig. 1–7.* 1922.—Anatomical characteristics and variations of the leaves of the forms and varieties of *Vaccinium Oxycoccus* are discussed in detail.—*W. C. Muenscher.*

4350. Gleisberg, W. **Vergleichende Blüten- und Fruchtanatomie der Vaccinium Oxycoccus Typen. [Comparative anatomy of flowers and fruits of Vaccinium Oxycoccus types.]** Ber. Deutsch. Bot. Ges. **40:** 202–211. *Fig. 1–7.* 1922.

4351. Hildegard, Herrmann. **Vergleichende Holzanatomie der Pappeln und Baumweiden. [Comparative anatomy of the wood of poplars and willows.]** Bot. Archiv **2:** 35–56, 79–112. *15 fig.* 1922.—Types of elements in *Populus tremula, P. alba, P. canadensis, P. nigra, Salix caprea, S. alba, S. fragilis, S. pentandra,* and *S. daphnoides* are described in great detail.—*William Seifriz.*

4352. Meyer, Fritz J. **Beiträge zur Kenntnis der Leitbündelanatomie. [On the anatomy of vascular bundles.]** Bot. Archiv **2:** 235–237. 1922.—The presence of commissural strands in the leptosporangiate Filicales is briefly discussed.—*William Seifriz.*

4353. Meyer, Fritz J. **Beiträge zur Kenntnis der Leitbündelanatomie. II. Das Leitbündelsystem von Polypodium vulgare. [On the anatomy of vascular bundles. II. The vascular system of Polypodium vulgare.]** Bot. Archiv **2:** 278–280. *3 fig.* 1922.—The individual bundles of the rhizome are concentric; they each consist of only a single tracheid strand. The bundles of the root are diarch. The petiole usually contains 4 bundles.—*William Seifriz.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. Transeau, *Editor*

L. H. Tiffany, *Assistant Editor*

(See also in this issue Entries 4424, 4427)

4354. Elmore, C. J. **The Diatoms (Bacillariodeae) of Nebraska.** Nebraska Univ. Studies **21:** 19–215. *861 fig.* 1922.—This is largely a taxonomic study, with notes on collecting, preserving, and mounting diatoms; with keys for identification. The large number and excellent nature of the figures are noteworthy. Thirty-seven genera and 252 species are included in the keys and descriptions, of which 69 are species of *Navicula.* New species or combinations noted are: *Sceptroneis pacifica* (Grun.), *Odontidium vulgare* (Bory), *O. anceps* (Ehr.), *Navicula stauroneiformis,* N. *rangoonensis* (Grun.), *N. parva* (Ehr.), *N. minnewaukonensis, N. mucronata, Gyrosigma delicatulum* (W. Sm.), *Cystopleura ventricosa* (Kütz.), *Homoecladia obtusa* (Lyngb.), *H. sigmoides* (Nitz.), *H. dubia* (W. Sm.), and *H. paxillifer* (Müller).—*R. J. Pool.*

4355. Hemleben, Hans. **Ueber den Kopulationsakt und die Geschlechtsverhältnisse der Zygnemales.** [Copulation and sexual relationship of the Zygnemales.] Bot. Archiv. 2: 249–259, 261–277. *Fig. 1–25.* 1922.—Copulation is in no way stimulated through mere contact of 2 threads. Only when a certain sexual maturity is reached can 2 threads unite. The state of nourishment of a thread seems to be an essential prerequisite to sexual ripeness. If Spirogyra filaments are kept under unfavorable living conditions for a time the possibility of copulation is greatly diminished. Just as in zygote formation in the Mucors so also in the Zygnemales is it necessary that 2 threads which are later to copulate first come into contact. Only through such contact are the out-growths which form the conjugating canal stimulated to development. In *Spirogyra crassa* the male cells are slightly smaller than the female; in the same length of thread there were 10,197 ♂ and 8,458 ♀ out of 18,655 cells.—*William Seifriz.*

4356. Huber, G., und F. Nipkow. **Experimentelle Untersuchungen über Entwicklung und Formbildung von Ceratium hirundinella O. F. Müller.** [Experimental study of the development and form of Ceratium hirundinella.] Flora 116: 114–215. *20 fig.* 1923.—*Ceratium hirundinella* was found to be exceptionally suitable for experimental work on the relation between form and environmental conditions, if cultures were started with encysted and not plankton material. The cysts were obtained from deposits in the mud of Lake Zurich in layers corresponding to the years 1914–1920. The failure to germinate at a depth of 100–135 m. is attributed to the chemical nature of the substratum, particularly its strong alkalinity, and lack of oxygen. In cultures the germination period is from 2 days to 4–5 weeks, varying with the age of cyst, quality of light, culture medium, but chiefly with the temperature. *Ceratium* responds readily to variations from the optimum of all these factors by modifications of form which are qualitatively and quantitatively related to the degree of divergence from the optimum. The modifications are of 2 types: (1) normal changes, i.e., size of body, and direction of horns, especially the spread of the posterior horns; (2) pathological changes, i.e., certain types of volume change, and such modification of horns as forking or multiplication, reduction or suppression. Temperatures from 15 to 23°C. give 90–98% normal forms; germination and growth may occur from 5 to 35°C., but near the extremes the number of abnormal forms may be over 60%. The apical horn is the most conservative; this is interpreted as indicating that it is phylogenetically the oldest.—*A. G. Stokey.*

4357. Mrozkówna, J. **Notatki naukowe.** [Scientific notes.] Acta Soc. Bot. Poloniae 1: No. 3. (1–2). *Fig. 17.* 1923.—*Pringsheimia scuttata* is reported from near Gdynia in the Baltic Sea.—*J. R. Schramm.*

4358. Parthasarathy Iyengar, M. O. **Note on some attached forms of Zygnemaceae.** Jour. Indian Bot. Soc. 3: 192–200. *4 pl.* 1923.—One species each of *Spirogyra, Zygnema,* and *Mougeotia,* collected from a tap water fountain in Madras, were growing attached. The algae remained sterile throughout a long period of observation, so could not be identified. The Spirogyra formed much lobed disc-like rhizoidal attachments at the ends of filaments, or from the sides of cells when in contact with the subtratum. The Zygnema produced knob-like unlobed rhizoids, sometimes cut off by cross walls, from the sides of cells. The Mougeotia attached by coiling about filaments of *Spirogyra* or other *Mougeotia* filaments; occasionally knob-like rhizoids were formed on the sides of cells. The author thinks that the formation of rhizoids and coils is a response to some contact stimulus.—*Winfield Dudgeon.*

4359. Setchell, William Albert. **A revision of the west North American species of Callophyllis.** Univ. California Publ. Bot. 10: 397–401. 1923.—The first 3 lines of the key to the species of the Pacific Coast of North America were syncopated to 2. An erratum slip restores the original lines, as follows:

1. Cystocarps on terminal segments only.....2
1. Cystocarps marginal (or on lateral lobes) only.....4
1. Cystocarps largely on the "disk" of the frond.....9

There are provided for in the key, 17 species from the west coast of North America, *C. flabellulata, C. violacea,* and *C. obtusifolia* already having been described. The 14 new species diagnosed are: *C. acrocarpa, C. filicina* Setchell & Swezy, *C. crassifolia* Setchell & Swezy, *C. marginifructa* Setchell & Swezy, *C. stenophylla, C. Thompsonii, C. Gardneri, C. odonthalioides,*

C. crenulata, C. plumosa Setchell & Swezy, *C. pinnata* Setchell & Swezy, *C. megalocarpa* Setchell & Swezy, *C. heanophylla*, and *C. dissecta* Setchell & Swezy.—*W. A. Setchell.*

4360. Setchell, William Albert. **Parasitic Florideae, II.** Univ. California Publ. Bot. 10: 393–396. 1923.—This continuation of a series begun in 1914 (Ibid 6: 1–34) diagnoses new genera and species of California Florideae parasitic on nearly related hosts, as follows: *Gracilariophila Gardneri* sp. nov., *Fauchecolax attenuata* gen. et sp. nov., *Rhodymeniocolax botryoidea* gen. et sp. nov., *Gonimophyllum Skottsbergii* sp. nov., *Polycoryne Gardneri* sp. nov., *Stromatocarpus Gardneri* sp. nov., and *Plocamiocolax pulvinata* gen. et sp. nov.—*W. A. Setchell.*

4361. Smith, G. M. **The phytoplankton of the Muskoka region, Ontario, Canada.** Trans. Wisconsin Acad. 20: 323–364. *6 pl., 119 fig.* 1922.—A report is presented on the phytoplankton of 47 lakes. Algae found are listed and data given as to abundance. New species described are as follows: *Tetraedron quadrilobatum, T. spiniferum, Kirchneriella arcuata, Arthrodesmus constrictus, Staurastrum sublongipes, S. lacustre.* New varieties: *Phaeococcus planctonicus* var. *ovalis, Ankistrodesmus spiralis* var. *fasciculatus, Closteriopsis longissimum* var. *tenuissimum, Micrasterias radiata* var. *gracillima, Xanthidium tetracentrotum* var. *hexagonum, X. antilopaeum* var. *limneticum, Arthrodesmus quiriferus* var. *subparallelus, Staurastrum cuspidatum* var. *canadense, S. Brebissonii* var. *paucispinum, S. setigerum* var. *brevispinum, S. leptocladum* var. *denticulatum, S. americanum* vars. *longiradiatum* and *triradiatum, S. aspinosum* var. *verrucosum, S. cingulum* vars. *tortum* and *obesum, S. anatinum* var. *curtum, S. protectum* var. *planctonicum, S. cerastes* var. *triradiatum.* New forms: *Micrasterias Mahabuleshwarensis* f. *dichotoma, Cosmarium contractum* var. *papillatum* f. *minor, Staurastrum pentacerum* f. *obesum, S. pentacerum* var. *tetracerum* f. *major, S. limneticum* var. *burmense* f. *tetragona.* New combinations: *Micrasterias radiata* var. *simplex* (*M. furcata* var. *simplex* Wolle), *Staurastrum americanum* (*S. grallatorium* var. *americanum* W. & G. S. West), *S. cingulum* (*S. paradoxum* var. *cingulum* W. & G. S. West), *S. pentacerum* (*S. Ophiura* var. *pentacerum* Wolle), *S. pentacerum* var. *tetracerum* (*S. Ophiura* var. *tetracerum* Wolle), *Xanthidium subhastiferum* var. *Toweri* (*X. hastiferum* var. *Toweri* Cushman). Zygospore formation in *Staurastrum limneticum* is noted.—*E. L. Fisk.*

4362. Steinecke, Fr. **Promallomonas, eine neue Gattung der Chromulinaceae.** [**Promallomonas, a new genus of the Chromulinaceae.**] Bot. Archiv 2: 112. 1922.—**Promallomonas aseta** is described. The genus is to be inserted before *Mallomonas.*—*William Seifriz.*

4363. Tahara, Masato. **Hondawara no Hai Hassei (Yohô).** [**The development of the embryo in Sargassum (preliminary note).**] Bot. Mag. Tôkyô 37: 159–161. 1923.—In the oogonium of *Sargassum*, according to the author's observations, there are 8 nuclei; 6 of the nuclei gradually degenerate while the remaining 2 grow. One of these 2 nuclei takes up a position near the upper end of the oogonium, while the other lies so near the extreme lower end that a careless observer might think it was about to be excreted from the oogonium. The exact stage at which fertilization occurs has not been determined. These 2 nuclei develop and the cytoplasm surrounding them takes on a special structure. After they have become separated by a septum, they divide almost simultaneously.—*Hideo Komuro.*

4364. Wildeman, E. de. **Anomalie des oogones et des anthéridies chez des espèces du genre Vaucheria.** [**Anomalous oogonia and antheridia in Vaucheria.**] Compt. Rend. Soc. Biol. 89: 669–670. 1923.—In *Vaucheria deBaryana* and *V. terrestris* anomalous oogonia are reported which behave similarly to those reported by Gabriel. In certain cases proliferation of the oogonium has been seen after separation from the rest of the filament; but it is impossible to be sure that the cross wall was complete and that there was no protoplasmic continuity towards the center of the wall.—*Oran Raber.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

Alexander W. Evans, *Editor*

(See also in this issue Entries 4120, 4133, 4173, 4424)

4365. Anonymous. **Notes.** Bryologist 26: 41–42. 1923.—Reference is made to the appearance of a new series of Bauer's Musci Europaei Exsiccati; the death of Wm. H. Pearson, the British hepaticologist, is chronicled; and attention is called to the possbility of securing tracings of the Stephani hepatic drawings.—*E. B. Chamberlain.*

4366. Andrews, A. LeRoy. **A new Bryum from Alberta.** Bryologist **26:** 43–45. 1923. —The author describes *Bryum Brinkmanii* Andrews, a species from Craigmyle, Alberta, Canada, based on material collected by A. Brinkman; it is related to *B. Marratii* Wils. The description gives very careful comparisons.—*E. B. Chamberlain.*

4367. Evans, Alexander W. **Notes on North American Hepaticae. X.**—Bryologist **26:** 55–67. 1923.—The author cites the specimens validating the extensions of range for *Targionia hypophylla* L., *Marchantia breviloba* Evans, and *M. paleacea* Bertol., recently made in the North American Flora [see Bot. Absts. 12, Entry 3378], reports *Lophozia Mildeana* (Gottsche) Schiffn., from Florida for the 1st time, and discusses *Mylia cuneifolia* (Hook.) S. F. Gray, here reported as new to North America. He further cites the specimens showing the extra-New England range of *Bazzania tricrenata* (Wahl.) Trevis., revives *B. ambigua* (Lindenb.) Trevis., as valid giving an extended discussion and a list of specimens studied, and proposes as new *B. nudicaulis* from Virginia and North Carolina. He also reduces *Leptocolea Jooriana* (Aust.) Evans to *L. cardiocarpa* (Mont.) Evans and both *Frullania Rappii* Evans and *F. mexicana* Lindenb. to *F. inflata* Gottsche, listing all specimens of the latter species, in the broad sense, now known from North America.—*E. B. Chamberlain.*

4368. Holzinger, John M. **Desmatodon arenaceus Sull. redivivus.** Bryologist **26:** 48–49. 1923.—*Desmatodon arenaceus* has often been considered synonymous with Schwaegrichen's *Barbula obtusifolia* or its variety *brevifolia*, but this conclusion has recently been called in question. The author reviews the literature on the question and decides that the matter is one depending upon individual opinion.—*E. B. Chamberlain.*

4369. Holzinger, John M. **Unusual provision for vegetative reproduction in Syrrhopodon parasiticus.** Bryologist **26:** 47. *2 fig.* 1923.—The author describes and figures the "gonidia" which occur as alga-like threads on the costa of the leaves, an unusual position.—*E. B. Chamberlain.*

4370. Holzinger, John M., and Edwin B. Bartram. **The genus Crossidium in North America.** Bryologist **26:** 67–73. *Pl. 5–6.* 1923.—This genus of the Pottiaceae is xerophilous in habit, and its species are mostly rare, particularly in a fruiting condition. It is especially characterized by green threads on the upper surface of the leaves. Of the 4 species heretofore credited to North America *C. Henrici* (Rau) Kindb. and *C. Manniae* (C. M.) Kindb. seem not to belong to the genus. The 3rd species, *C. squamigerum* (Viv.) Jur., is apparently well understood and occurs in both Europe and America. The American records for the 4th species, the European *C. chloronotos* (Brid.) Jur. were, however, based on specimens incorrectly determined, and the authors would refer some of these to their new species, *C. desertorum*, based on material from Arizona. They also propose as new, *C. succulentum*, likewise based largely on Arizona specimens. Both new species are illustrated.—*E. B. Chamberlain.*

4371. Kashyap, S. R., and M. L. Sethi. **A new liverwort from Madras.** Jour. Indian Bot. Soc. **3:** 201–203. *3 pl.* 1923.—The new genus **Fysonia** Kashyap is described, based on *F. tenera* Kashyap n. sp., and the more important anatomical features are illustrated. The thalli are mostly 12 mm. long, 0.3–0.4 mm. wide and 0.2 mm. thick and form dense patches by overlapping. They produce ventral scales and the 2 kinds of rhizoids characteristic of the Marchantiales, while the dorsal portion shows small air chambers and epidermal pores. The sexual organs arise on separate plants, and both antheridia and archegonia are borne in pits. The sporogonium develops a foot but no seta, and the capsule encloses about 120 spores, unaccompanied by sterile cells. The genus is regarded as intermediate between *Riccia* and *Corsinia.—Winfield Dudgeon.*

4372. Pearson, William Henry. **Notes on a collection of New Zealand Hepaticae.** Univ. California Publ. **10:** 307–371. *Pl. 83–103.* 1923.—The author bases his report on a collection of New Zealand Hepaticae made by W. A. Setchell in 1904. The species listed number 38 and are accompanied by data regarding localities and often by critical notes. The following new species are proposed: *Anthoceros ? nostocoides, Frullania Setchellii, Isotachis minima, Lepidozia brevipinna, Marchantia Setchellii, Plagiochila neohoweana* (of Tasmania, based on specimens erroneously referred to the New Zealand *P. deltoidea* Lindenb.), *Riccardia bistrata, R. riccioides, Solenostoma brevissimum,* and *Symphyogyna microcalyptra.*

In addition 2 new combinations are made, *Bazzania fissistipa* (Steph.), based on *Mastigobryum fissistipum* Steph., and *Riccardia marginata* (Colenso), based on *Aneura marginata* Colenso; while *Plagiochila Howeana* Steph. is reduced to synonymy under *P. deltoidea*. The plates illustrate the new species and also *Frullania Colensoana* Steph., *F. fugax* Tayl., *F. squarrosula* Hook. f. & Tayl., *Lepidozia plumulosa* L. & L., *Plagiochila arbuscula* (Brid.) L. & L., *P. deltoidea*, *P. Kirkii* Mitt., *Riccardia marginata*, *Radula flavifolia* Tayl. (of Cape Horn), *R. physoloba* Mont., and *R. plicata* Mitt.—*W. A. Setchell.*

4373. Pearson, William Henry. **More New Zealand Hepaticae.** Univ. California Publ. Bot. **10:** 373–393. *Pl. 104–109.* 1923.—This is a supplementary report on the collection of New Zealand Hepaticae made by W. A. Setchell in 1904 [see preceding entry]. The species listed number 14, of which the following are proposed as new: *Aspiromitus novozealandica*, *Frullania laciniaeflora*, *F. obtusiloba*, *Lophocolea minuta*, and *Pallavicinia Setchellii*. In addition the new var. *crassiflora* is described under *Lophocolea heterophylloides* Nees. The plates illustrate *Symphyogyna grandibracteata* Steph., the new variety, and all the new species except the 1st Frullania.—*W. A. Setchell.*

4374. Sim, T. R., and H. N. Dixon. **Bryophta of Southern Rhodesia.** South African Jour. Sci. **18:** 294–335. 1922.—The paper is divided into 3 parts. The 1st, by Sim, discusses the "Conditions affecting the distribution of Bryophytes in Rhodesia." The 2nd, by the same author, lists the Hepaticae of the region, 24 species being cited with data regarding local stations and collectors and notes on general distribution. The 3rd, by Dixon, is a "Contribution to the moss flora of Southern Rhodesia and Portuguese Gaza-Land." The author records 129 species, with data similar to those given under the Hepaticae and with numerous critical remarks. The following are proposed as new: *Aongstroemia gymnomitrioides*, *Barbula elongata*, *B. salisburiensis*, *Brachymenium rhodesiae*, *Braunia peristomata*, *Bryum rigidicuspis*, *Calymperes victoriae*, *Campylopus angustinervis*, *Ectropothecium brevisetum*, *Fabronia victoriae*, *Fissidens calochlorus*, *F. corrugatulus*, *F. dubiosus*, *F. latifolius*, *F. microandrogynus*, *F. rotundatus*, *Funaria longicollis*, *Gyroweisia latifolia*, *Hymenostomum eurybasis*, *Isopterygium aquaticum*, *Philonotis laeviuscula*, *Ptychomitrium eurybasis*, *Trachyphyllum maximum*, *Tortella obtusifolia*, *T. opaca* and *Trichostomum cyathiforme*. In addition, the new var. *pycnophyllum* is proposed under *Bryum truncorum* Bory and the new var. *perlamellosus* under *Campylopus trichodes* Lor.; *Polytrichum trichodes* Rehm. is reduced to varietal rank under *P. commune* L.; and the new comb. *Calyptothecium Brotheri* (Par.) is made, based on *Neckera Brotheri* Par. The report is based largely on collections made by Eyles, Sim, and Wager; and the regions around Victoria Falls and Zimbabwe proved to be particularly favorable for both liverworts and mosses.—*E. M. Doidge.*

4375. Wager, H. **Protonemal developments of mosses.** South African Jour. Sci. **18:** 244–245. *2 fig.* 1922.—An interesting feature of the moss *Nanobryum Dummeri* Dixon lies in its protonema. Instead of being entirely filamentous it shows an advance in the direction of a flat prothallial structure. Another moss, *Bryum* sp., produces an enormous number of small rod-like filaments, each having usually 4 cells and never more than 10.—*E. M. Doidge.*

4376. Williams, R. S. **Pilotrichum Leoni. sp. nov.** Bryologist **26:** 50–51. *7 fig.* 1923. —The author describes and figures *Pilotrichum Leoni* from Pico Turquino, Cuba, based on material collected by Brother Leon. The species is most closely related to *P. lophophylla* Mitt.—*E. B. Chamberlain.*

4377. Williams, R. S. **Syrrhopodon parasiticus (Sw.) Besch. in Florida.** Bryologist **26:** 46. *9 fig.* 1923.—The author notes the discovery by Rapp of this tropical moss at Oviedo, Florida, and figures the salient features.—*E. B. Chamberlain.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. Fitzpatrick, *Editor*

D. S. Welch, *Assistant Editor*

(See also in this issue Entries 4115, 4120, 4450, 4452, 4455, 4456, 4460, 4478, 4507, 4511, 4512, 4522, 4523, 4532, 4535, 4536, 4541, 4628, 4679, 4680, 4723, 4727, 4729, 4730, 4731, 4733, 4734, 4735)

FUNGI

4378. Anonymous. **Liste des cultures présentées à l'Exposition du Centenaire de Pasteur, par le Bureau Central des Cultures de Champignons de Baarn (Holland). [List of cultures exhibited at the Pasteur Centennial Exposition by the Central Bureau of Fungus Cultures, Baarn.]** Congrès Path. Vég., Strasbourg *P. 25–28*. Imprimerie Alsacienne: Strasbourg, 1923.—Separate lists of saprophytic fungi and of fungi parasitic on plants are given.—*Frederick V. Rand.*

4379. Anderson, H. W. **Notes on the Nematospora disease of lima beans.** [Abstract.] Phytopathology **14**: 31. 1924.

4380. Bolle, [Mlle.]. **Le Bureau Central de Cultures de Champignon de Baarn (Holland). [The Central Bureau for Fungus Cultures at Baarn.]** Congrès Path. Vég. Strasbourg *P. 21–25*. Imprimerie Alsacienne: Strasbourg, 1923.—The history, experiences and methods of the Bureau for the 20 years of its existence are briefly related. The appearance of disease is determined by the reciprocal action of host and parasite. Therefore the old classification of diseases based on taxonomy of the parasite is unsatisfactory. The plant disease classification system of Appel and Westerdijk employs symptoms which are easily observable by the naked eye. This classification is used at the Institute for parasitic fungi; saprophytes are grouped in their mycological order.—*Frederick V. Rand.*

4381. Burlingham, Gertrude S. **Notes on species of Russula.** Mycologia **16**: 16–23. *Pl. 4–5*. 1924.—The following species are described as new from various sources in North America: *Russula Kellyi*, *R. alcalinicola*, *R. operta*, *R. dura*, *R. subtilis*, *R. fucosa*, *R. Burkei*, *R. affinis*, and *R. chlorinosma*.—*G. R. Bisby.*

4382. Chenantais, J. E. **Valeur taxinomique du sillon germinatif des ascospores chez les Pyrénomycètes. [The taxonomic value of the germinal ridge of the ascospores in the Pyrenomycetes.]** Bull. Trimest. Soc. Mycol. France **39**: 65–68. 1923.—Views contrary to those of F. Vincens [see Bot. Absts. 11, Entry 2745] are expressed.—*S. Blumer.*

4383. Cook, Melville T. **The life history of Nectria ipomoea.** Mycologia **15**: 233–235. *P. 25*. 1923.—This fungus is commonly found on sweet potatoes rotted by *Sphaeronema fimbriatum* and was studied in test tube and Petri-dish cultures. The formation of septa and perithecia appears to be stimulated by diminution of food supply and "there appears to be no definite order for the formation of the perithecia. They may originate from one, or more than one, hypha and in many cases show striking resemblances to the early stages of the Erysiphaceae and Aspergillaceae, but no union of cells or nuclei was observed. The massing and tangling of these hyphae is followed by increased growth and by the formation of numerous septa until we have a more or less globular structure"—the perithecium. Microtome sections of these structures show homogeneous masses of cells which later become differentiated into central masses of thin-walled cells surrounded by several layers of small cells. No ascogonia were found. The beak and asci arise from opposite sides of the central mass of cells but the exact origin of the asci was not determined. The asci grow rapidly until the upper ends reach the lower part of the beak and as the ascospores mature they escape through it. The life history of this fungus is very similar to that of *Nectria galligena* described by Cayley.—*H. R. Rosen.*

4384. Dietz, S. M., and I. W. Clokey. **Achyrodes aureum (L.) Kuntze, a host for many rusts.** [Abstract.] Phytopathology **14**: 36–37. 1924.

4385. Douin, R. [Rev. of: Pillay, T. P. **Zur Entwickelungsgeschicte von Sphaerobolus stellatus Tode. (The development of Sphaerobolus stellatus.)** Diss. Jahrb. Phil. Fakultät II Univ. Bern **3**: 197–219. 1923. (see Bot. Absts. 12, Entry 4221).] Rev. Gen. Bot. **35**: 544. 1923.

4386. Ezekiel, Walter N. **Strains of the brown-rot fungus, Sclerotinia americana.** [Abstract.] Phytopathology **14:** 32. 1924.

4387. Fitzpatrick, H. M. **Generic concepts in the Pythiaceae and Blastocladiaceae.** Mycologia **15:** 166–173. 1923.—*Septocladia dichotoma* Coker and Grant is considered to be the same as *Blastocladia strangulata* Barrett. The genera *Allomyces* and *Blastocladia* are recognized to be closely related. Edson's genus *Rheosporangium*, Schroeter's *Nematosporangium*, and Butler's subgenus *Aphragmium* of *Pythium* are put into synonymy. *Nematosporangium aphanidermatum* which Edson described as a pathogene of sugar beet seedlings is according to Carpenter the same as *Pythium Butleri* Subramaniam, a fungus which attacks ginger (*Zingiber officinale*), tobacco, and papaya in India, and sugar cane in Hawaii. "As the specific name of Edson antedates that of Subramaniam, the binomial *Pythium aphanidermatum* (Edson) comb. nov. is to be preferred. If the genus *Nematosporangium* is recognized which seems to the writer desirable, then the species should bear the name *Nematosporangium, aphanidermatum* (Edson) comb. nov." Diagnostic features of *Nematosporangium* are given. Evidence is presented indicating that the genera *Pythium* and *Phytophthora* should be united. As to the formation of a thin-walled vesicle at the mouth of the sporangium in *Pythium*, "a similar structure has been described in *Polyphagus, Myzocytium, Lagenidium, Rhipidium*, and other genera of the lower Phycomycetes." It has been found in *Phytophthora cactorum, P. Arecae*, and *P. parasitica*. "In merging the genera *Pythium* and *Phytophthora*, the name *Pythium* would of necessity be retained for the group, since it is the older. The writer suggests that the family Pythiaceae, consisting of the forms now included in *Pythium* and *Phytophthora* and their nearest relatives, *Pythiogeton* and *Pythiacystis*, be incorporated in the Peronosporales as a family distinct from the Peronosporaceae." Differences between these families are given.—*H. R. Rosen.*

4388. Fonseca, O. da, et E. A. de Area Leao. **Sur la systématique des champignons produisant des chromoblastomycoses. [On the taxonomy of the fungi causing chromoblastomycoses.]** Compt. Rend. Soc. Biol. **89:** 762–763. 1923.—The American chromoblastomycoses form a separate group of the fungi causing verrucose dermatitis: their etiology differs markedly. The only case reported in the U. S. A. was caused by *Phialophora verrucosa* Medlar. In Brazil 8 cases are reported from *Acrotheca pedrosoi* which Brumpt without seeing the conidia had previously called *Hormodendrum pedrosoi.—Oran Raber.*

4389. Friederichs, K., en W. Bally. **Résumé van een publicatie over de parasitische schimmels van den bessenboeboek. [Résumé of a publication on the parasitic molds of the coffee-berry beetle** (see following entry).] Mededeel. Koffiebessenboeboek-Fonds 5. *78–80.* 1922.

4390. Friederichs, K., en W. Bally. **Over de parasitische schimmels die den Koffiebessenboeboek dooden. [Parasitic fungi which kill the coffee-berry beetle.]** Mededeel. Koffiebessenboeboek-Fonds 6. *103–147. Pl. 5, 2 fig.* 1923. [With English summary.]—The coffee-berry beetle, *Stephanoderes hampei* Ferr. *coffeae* Heged, is killed by 2 fungi here described as new species: *Botrytis stephanoderis* Bally and *Spicaria javanica* Bally. The fungi are favored by the rainy season but no natural epizootics were observed. As a rule the abdomen of an infected beetle is pushed out of the hole in the berry and a mycelial plug is formed. The writer gives extensive figures showing that in berries containing beetles, infected and uninfected ones are found side by side. The presence of the fungus does not materially aid in preventing a poor coffee crop. Experimental laboratory results indicate that beetles and larvae can be successfully infected. The fungi can be introduced into new regions but their spread is limited.—*Cecil Yampolsky.*

4391. Garrett, A. O. **The aecial stage of Puccinia Pattersoniana.** Mycologia **16:** 33–35. 1924.—Field evidence suggested a relation between an Aecidium on *Brodiaea Douglasii* and *Puccinia Pattersoniana* on *Agropyron spicatum*. Acting on this suggestion, Mains [see Bot. Absts. 12, Entry 4211] found evidence from correlation studies between *P. Pattersoniana* and the short-cycled *P. Moreniana* on *Brodiaea*, that the aecia of the former rust should occur upon *Brodiaea*. A culture in the garden has now confirmed the relationship — *G. R. Bisby.*

4392. Herre, Albert W. C. T. **Cordyceps sphingum Schw. in the Philippines.** Mycologia **15:** 280–281. *1 fig.* 1923.—This is the 1st record of this fungus in the Philippines.—*H. R. Rosen.*

4393. Jaubert, A., et Goy. **Affection à levures, traitée et guérie par la vaccinothérapie. [A yeast infection treated and cured by vaccinotherapy.]** Compt. Rend. Soc. Biol. **89:** 460–461. 1923.—Severe lesions on the hands and at the nails are described. The causal organism was found to be a yeast of the genus *Cryptococcus;* cultural characters are given.—*Oran Raber.*

4394. Keissler, C. **Schedae ad kryptogamas exsiccatas editae a Museo historiae naturalis Vindobonensi. [Labels for the cryptogamic exsiccatae edited by the Museum of Natural History at Vienna.]** Ann. Naturhist. Mus. Wien **36:** 74–89. 1923.—This is a continuation of a preceding article [see Bot. Absts. 13, Entry 4424] and includes the fungi of decades 98–103.—*A. S. Hitchcock.*

4395. Kobel, F. **Ein neues Färbeverfahren für parasitische Pilze. [A new method of staining parasitic fungi.]** Mitteil. Naturf. Ges. Bern **1919:** 44. 1920. [Abstract.]—A solution of 0.1 gm. anilin blue in 50 cc. lactic acid and 100 cc. water proved satisfactory for staining mycelium and haustoria of Peronosporaceae and Uredinales. Sections kept in the solution 5 minutes, rinsed, and warmed in a few drops of lactic acid show the mycelium colored intensely blue while the host tissue remains nearly unchanged. The stain is not permanent.—*S. Blumer.*

4396. Lehman, S. G., and Frederick A. Wolf. **A new downy mildew of soy beans.** [Abstract.] Phytopathology **14:** 28. 1924.—The name *Peronospora Sojae* n. sp. is suggested for the organism.—*B. B. Higgins.*

4397. Levine, M. M. **A statistical study of the comparative morphology of biologic forms of Puccinia graminis.** Jour. Agric. Res. **24:** 539–568. *2 pl., 14 fig.* 1923.—The identity and relationship of *Puccinia graminis tritici, P. graminis secalis, P. graminis avenae, P. graminis phleipratensis,* and *P. graminis agrostis* were further confirmed by the use of biometrical constants obtained from the measurements of the aeciospores, urediniospores, and teliospores of each of the biologic forms studied. The forms produced under uniform environmental conditions differed markedly and significantly. In some cases the difference occurred in both diameters of the various spore types; in other cases there was a difference in dimension only. Congenial hosts did not in any way change the morphology of the spores, whereas resistant varieties and adverse cultural conditions (excessive heat, deficient light, drought) invariably tended to decrease the size of the spores.—*Author.*

4398. Lloyd, C. G. **The truffle industry of Italy.** Mycologia **15:** 236–238. 1923.—An account is given of how and where truffles are found. The following species are mentioned: *Tuber magnatum, T. aestivum, T. brumale, T. melanosporum,* and *T. macrosporum.*—*H. R. Rosen.*

4399. McKinney, H. H. **An undescribed imperfect fungus associated with wheat foot-rot in Oklahoma.** [Abstract.] Phytopathology **14:** 34. 1924.

4400. Magalhaes, Octavio de, et Aroeira Neves. **Contribution à l'étude des teignes au Brésil. [Contribution to the study of ringworm in Brazil.]** Compt. Rend. Soc. Biol. **89:** 769–772. *1 fig.* 1923.—A description and cultural characters are given of *Trichophyton multicolor* n. sp.—*Oran Raber.*

4401. Meinecke, E. P. **The European mistletoe.** [Rev. of: Tubeuf, Karl von. **Monographie der Mistel.** *xii + 832 p.* R. Oldenbourg: Munich and Berlin, 1923 (see Bot. Absts. 12, Entry 6694).] Mycologia **16:** 41–42. 1924.—The fungi upon mistletoe (*Viscum album*) in Europe include the parasite, or hemi-parasite, *Sphaeropsis Visci.* [See also Bot. Absts. 13, Entry 258.]—*G. R. Bisby.*

4402. Murrill, W. A. **Florida fungi—I.** Mycologia **15:** 278–279. 1923.—This is a list of 7 species of agarics and 38 of pileate polypores collected during March, 1923, in hammocks of Florida. *Trametes amygdalinus* comb. nov. (*Polyporus amygdalinus* Berk. & Rav.) is included.—*H. R. Rosen.*

4403. Murrill, W. A. **Virginia fungi.** Mycologia **15:** 243–244. 1923.—This is a list of some 40, mostly fleshy and woody, fungi observed at Mountain Lake and at Blacksburg, Virginia.—*H. R. Rosen.*

4404. Murrill, W. A. **Woodstock fungi.** Mycologia **16:** 44–46. 1924.—This is a brief list of fungi collected at Woodstock, New York.—*G. R. Bisby.*

4405. Murrill, W. A. **The larger British fungi.** [Rev. of: Ramsbottom, J. **A handbook of the larger British fungi.** *iv + 222 p.* British Museum: London, 1923.] Mycologia **16:** 42–43. 1924.

4406. Norton, J. B. S., and Walter N. Ezekiel. **The name of the American brown-rot Sclerotinia.** [Abstract.] Phytopathology **14:** 31–32. 1924.—The name *Sclerotinia americana* (Wormald) comb. nov. is proposed for this fungus.—*B. B. Higgins.*

4407. Overholts, L. O. **The species of Poria described by Schweinitz.** Mycologia **15:** 207–232. *Pl. 21–24, fig. 1–30.* 1923.—This is a morphologic and taxonomic study of 22 species of resupinate polypores, referable to *Poria*, described by Schweinitz. The following are included: *P. candidissima* (Schw.) Cooke, [*P. meruloides* Peck (manuscript name), *P. hymenocytis* Berk. & Br., *P. subtile*], "in microscopic features the plant has great similarity to thin lacerate specimens of *P. radula;*" *P. Caryae* (Schw.) Cooke on *Carya alba; Boletus cinerascens* Schw.; *Poria cinerea* (Schw.) Cooke; *Boletus croceus* Schw. which Schweinitz later referred to *Poria nitida; P. decolorans* (Schw.) Cooke; *P. favescens* (Schw.) Cooke (a plant having external characteristics of *Trametes sepium*); *P. interna* (Schw.) Cooke; *P. juglandina* (Schw.) Cooke; *Boletus lilacinus* Schw.; *Poria nigropurpurea* (Schw.) Cooke, a plant similar in some aspects to *P. adustus* and *P. dichrous; P. papyracea* (Schw.) Cooke; *P. pulchella* (Schw.) Cooke; *P. Rhododendri* (Schw.) Cooke; "this species seems undoubtedly to be the same as *Trametes sepium;*" *P. Sassafras* (Schw.) Cooke; *P. spissa* (Schw.) Cooke (*P. laetifica* Peck); *P. superficialis* (Schw.) Cooke (*P. viticola* and probably *P. contigua* Pers. refer to the same plant); *P. tenuis* (Schw.) Cooke (*P. medulla-panis* and *P. pulchella* are closely related); *P. tulipifera* (Schw.) Saccardo, often pileate and hence generally included in *Polyporus; P. vitellina* (Schw.) Cooke; *P. viticola* (Schw.) Cooke "a well known species which has passed under a variety of names of which *P. contigua* is the oldest;" *P. xantholoma* (Schw.) Cooke (this should be referred to *P. medullo-panis.*—*H. R. Rosen.*

4408. Petry, E. J., and Lynn D. Hutton. **Conjugation in the aecium of Dicaeoma distichlidis.** [Abstract.] Phytopathology **14:** 33–34. 1924.

4409. Preti, G. **Osservazioni intorno ad una fumaggine della "Bumelia ambigua" Ten. ed a quelle degli agrumi. [Observations on a sooty-mold of Bumelia ambigua Ten. and of those of citrus.]** Rev. Patol. Veg. **13:** 69–84. 1923.—A fumagine (sooty-mold) on *Bumelia ambigua* Ten. (*B. lycioides* Wild.) was studied and described both as to its various characters on the host and in culture, and comparison was made with various other sooty-molds. It was identified as *Limacinia Citri* (Briosi e Passerini) Saccardo with the following synonymy: *Apiosporium Citri* Briosi e Passerini, *Fumago Citri* Catt., *Capnodium Citri* Prillieux, *C. Citri* Mont., *Morfea Citri* Roze, *Meliola Citri* Saccardo, *M. Penzigi* Sacc., and *Phloesphaeria Citri* Arnaud. The author also concludes that *Meliola Camelliae* (Cattaneo) Saccardo has the following as synonyms: *Fumago Camelliae* Catt.,? *Capnodium Citri* Berk. et Desmaziere, *C. Citri* Prillieux,? *Morfea Hesperidi* Roze, *Limacinia Camelliae* Saccardo, *Pleosphaeria Citri* Arnaud.—*F. M. Blodgett.*

4410. Rose, Jessie P. **Fusarium culmorum in Oregon, its varieties and strains that cause disease of cereals and grasses.** [Abstract.] Phytopathology **14:** 49. 1924.

4411. Seaver, Fred J. **Additions to the rust flora of the West Indies.** Mycologia **16:** 46–48. 1924.—The following rusts are additions to previous lists of rusts from the West Indies: *Puccinia esclavensis* Diet. & Holw., *P. Huberi* P. Henn., *Uromyces Anthacanthi* H. S. Jackson sp. nov., and *U. Salmeae* Arth. & Holw.—*G. R. Bisby.*

4412. Seaver, Fred J. **Fungous flora of St. Thomas.** Mycologia **16:** 1–15. *Pl. 1–3.* 1924.—Notes are given regarding the topography, climate, and vegetation of the island. The list of fungi, made from collections by the author and from previous reports of fungi collected there contains 1 myxomycete, 1 phycomycete, 45 ascomycetes, 13 imperfect fungi, 1 smut, 23 rusts, and 25 other basidiomycetes. *Bactrospora integrispora, Dermatea dimorpha, Niptera subiculata, Gloniopsis guttulata, Hysterium Calabash, Phoma Leonotidis,* and *Didymaria Solani* are described as new.—*G. R. Bisby.*

4413. Shear, C. L. **Phoma: A sample of mycological nomenclature and classification.** Mycologia **15:** 174–182. 1923.—A historical survey is presented of the interpretations of *Phoma* Fries calling attention to the diversity of these and to the use of this genus as an "omnium gatherum" of a large number of species, over 1,700, many of them unrelated. In Fries' first description of this genus (1819) the type is cited as *Sphaeria pustula* Pers. and later (1823) *S. saligna* is added. Both of these are now known to be ascomycetes, although Fries also added several true pycnial forms. Later he added another species, *P. Hederae* Desm., and still later (1843) in a re-description of the genus he includes 4 species, "his original monotype *P. pustula*, also *P. saligna*, *P. Populi*. and *P. Hederae*. The last, however, a nonascogenous form, he says he does not consider a good *Phoma*." Emendations by various authors of Fries' descriptions are discussed and it is shown that the only satisfactory basis for a stable taxonomy rests upon adoption of types and upon a greater knowledge of life histories, comparative morphology, and development.—*H. R. Rosen.*

4414. Snell, Walter H. **Occurrence and identity of cotton mill fungi.** Mycologia **15:** 153–165. *Pl. 16.* 1923.—Observations are recorded upon the occurrence of the following myxomycetes and fungi in cotton mills: *Fuligo ovata* (Schaeff.) Macbr., *Stemonitis fusca* (Roth) Rost., *Reticularia lycoperdon* Bull., *Peniophora pubera* (Fr.) Burt, *P. gigantea* (Fr.) Mass, *Coniophora cerebella* Pers., and *Merulius lacrymans* (Wulf.) ex Fr. "*Lenzites sepiaria* Fr. and *L. trabea* Pers. ex Fr. are compared as to their importance in the decay of coniferous roof planks, time and manner of fruiting within mills, identification, cultural characters, etc." Wood blocks from the following trees were used in determining the percentage of loss of oven dry weight after 1 year of incubation: *Taxodium distichum, Chamaecyparis Lawsoniana, Pinus palustris, Pseudotsuga taxifolia, Pinus ponderosa, Picea sitchensis, Pinus Strobus, Quercus alba, Castanea dentata, Acer pseudoplatanus, Liquidambar styraciflua, Tilia americana,* and *Liriodendron tulipifera*. "Authentic cases of decay of weave shed roofs by *Trametes serialis* Fr. are reported. The danger is emphasized of imputing certain cases of decay to *Fomes officinalis* Vill. because of a similarity of characters shared by this species and abortive forms of *Trametes serialis*. Brief observations are reported upon the occurrence and cultural characters of *Trametes carnea* Nees ex Cooke (called *Fomes roseus* Alb. and Sch. ex Cooke in a previous paper). Evidence is adduced to show that the Lentinus found decaying weave shed roofs is *L. lepideus* Fr. and not *L. tigrinus* Fr. This evidence is derived from a comparative study of the sporophores, spores, wood and agar cultures of the two species, and durability tests upon woods of coniferous and hardwood trees. *L. tigrinus* was unable to decay any of the coniferous heartwoods tried. Basidiospores of *Lentinus tigrinus* from beneath the veil of a specimen kept in a herbarium for five years germinated at high percentages. The writer's single basidiospore culture of this species adds another bit of evidence to the discussion of the questioned autonomous nature of the *Lentodium squamulosum* form of *Lentinus tigrinus*." —*H. R. Rosen.*

4415. Stakman, E. C., and M. N. Levine. **Puccinia graminis on Poa spp. in the United States.** [Abstract.] Phytopathology **14:** 39. 1924.

4416. Stevens, F. L., and Amy G. Weedon. **Three new Myriangiaceous fungi from South America.** Mycologia **15:** 197–206. *Pl. 18–20.* 1923.—The following new genera and new species, collected in British Guiana, are described: **Myrianginella** gen. nov., differing from *Myriangina* by the superficial development of the ascoma; *Myrianginella Tapirae* on *Tapira* sp.; **Kusanoopsis** gen. nov., with a stroma somewhat resembling *Kusanoa* and *Dictyonella erysiphoides* but differing from these in several essential features; *Kusanoopsis guianensis*, on unknown dictotyledonous host; and *Myriangina Miconiae* on *Miconia* sp., a fungus differing materially from the only other known species in this genus, *M. mirabilis* (P. Henn.) v. Höhn. (*Dictyomollisia albido-granulata* Rehm). The presence of these Myriangiaceous fungi was not recognized until the microtome sections were examined, due to their superficial resemblance to the other fungi upon the leaves (in one case *Endodothella Tapirae;* in the others, *Phyllachora* and *Echidnodella*).—*H. R. Rosen.*

4417. Taubenhaus, J. J. **An abortive sporophore of Sclerotium Rolfsii.** [Abstract.] Phytopathology **14:** 37. 1924.

4418. Tehon, L. R., and P. A. Young. **A new Hysterium from Illinois.** Mycologia **16:** 30–32. *Fig. 1.* 1924.—*Hysterium pulcherrimum* is described as new. It was found on the bark of *Platanus occidentalis*, and appears most closely allied with *H. pulicare.*—*G. R. Bisby.*

4419. Walker, Leva B. **Some observations on the development of Endogone malleola Hark.** Mycologia **15:** 245–257. *Pl. 26–27, fig. 1–3.* 1923.—The author's summary follows: "There is great variation in the sporangiocarps of *E. malleola.* Large and small sporangial types of fructifications are noted. The spores germinate readily in water. By means of anastomoses larger distributive hyphae develop. Protoplasmic movement is very rapid in the distributive hyphae. Large masses of firmly interwoven moniliform cells superficially resembling sporangiocarps develop on cultures, but true sporangiocarps were never produced. The development of the sporangia is entirely phycomycetous. A close relationship between *E. malleola* and *Mortierella* is noted."—*H. R. Rosen.*

4420. Weber, George F. **Ephelis mexicana Fr., Balansia hypoxylon (Pk.) Atk., on sandbur (Cenchrus echinatus L.).** [Abstract.] Phytopathology **14:** 66. 1924.

4421. Weber, George F. **Poria cocos developed on tuckahoe found attached to orange tree root.** [Abstract.] Phytopathology **14:** 35. 1924.

4422. Weir, James R. **The genus Chrysomyxa.** Mycologia **15:** 183–187. *Pl. 17.* 1923. —As here described the genus *Chrysomyxa* is used as Arthur used it, only for short cycled forms with single celled teliospores arranged in simple or branched columns. The 2 species described are *C. abietis* (Wallr.) Unger, and *C. Weirii* Jackson. Special notes on the occurrence and distribution of the latter species are included and the telial nature of the sori demonstrated by germination and infection experiments.—*H. R. Rosen.*

4423. Whetzel, H. H., and John M. Arthur. **The grey bulb-rot of tulips.** [Abstract.] Phytopathology **14:** 30–31. 1924.—The causal organism, known formerly as *Sclerotium tuliparum* Klebahn, is transferred upon morphological grounds to the genus *Rhizoctonia* and becomes *R. tuliparum* (Klebahn) n. comb.—*B. B. Higgins.*

4424. Zahlbruckner, A. **Schedae ad kryptogamas exsiccatas editae a Museo Historiae Naturalis Vindobonensis. [Labels for the cryptogamic exsiccatae edited by the Museum of Natural History at Vienna.]** Ann. Naturhist. Mus. Wien **36:** 36–49. 1923.—This covers Centuries 25 and 26, including fungi (decades 92–97), algae (decades 36–38), lichens (decades 62–67), and mosses (decades 54–58). [See also Bot. Absts. 13, Entry 4394.]—*A. S. Hitchcock.*

LICHENS

4425. Heaton, Nöel. **Lichens and their action on the glass and leadings of church windows.** Nature **112:** 505–506. 1923.—This is a comment by Heaton upon the article by Ethel Mellor [see Bot. Absts. 13, Entry 1853], and her reply. Heaton regards the growth of lichens on the glass as a result rather than a cause of the decay. He states that he has found medieval glass, especially of the fourteenth century, to contain phosphates, and suggests that this would favor the growth. Mellor adds that certain species occur only on unaltered glass, but disappear leaving a roughened surface.—*O. A. Stevens.*

4426. Vainio, Edv. A. **Lichenes a W. A. Setchell et H. E. Parks in Insula Tahiti a 1922 collecti.** Univ. Calif. Pub. Bot. **12:** 1–16. 1924.—Some 62 species, varieties, or forms are enumerated, of which the following species are noted as new: *Usnea diademensis, U. faulauensis, U. societatis, Ramalina thraustoides, Parmelia Setchellii, Pertusaria hypochrysea, Sticta lobariaeformis, Pseudocyphellaria amphistictoides, Collema thysanaeopsis, Bacidia melancheiloides, Sporopodium ochraceoluteum, S. Inocarpi, Lecidea (Psora) purpurescens, L. (Psora) societatis, Pilocarpon chlorinum, P. cateileum, Endocarpon tahitense, Pyrenula oroferensis, Porina (Segestria) Hibisci, P. (Sagedinula) Mangiferae, P. (Sagestrinula) perminuta.* —*W. A. Setchell.*

BACTERIA

4427. Alexeieff, A. **Sur la structure des bactéries. Les mitochondries et les grains métachromatiques chez les bactéries et quelques autres protistes. [The structure of bacteria: mitochondria and metachromatic granules in bacteria and some other Protista.]** Compt.

Rend. Soc. Biol. 89: 728–730. 1923.—In this preliminary paper the following results and conclusions are announced: in *B. mitochondrialis* n. sp., which causes butyric fermentation, plasma, metachromatin granules, mitochondria, and glycogen are distinguishable. *Cercomonas fusiformis* feeds upon these bacteria almost exclusively and during digestion the glycogen disappears first, followed by the mitochondria and the plasma; the metachromatic granules are rejected. They are hence considered not to be reserve food materials but the zymogen of the butyrase. Since the mitochondria do not take nuclear stains they are not thought to be chromatin material.—Only bacteria rich in mitochondria are Gram positive.—The bacteria and blue green algae are considered as primitive rather than simplified forms because of the absence of both nucleus and chromatin. Granules such as those observed in *B. fusiformis* are not nuclei but only mitochondria, and this Bacillus like all the others is only a "cytode" rather than a cell.—In many cases metachromatin material is found in the cells in a dissolved condition and becomes precipitated out under the action of reagents and stains. The term "promucoid" is proposed for dissolved metachromatin, "mucoid" for precipitated metachromatin, and "mucosomes" for the metachromatin granules.—In the vacuoles of diatoms there is a large quantity of "promucoid" which at the exterior of the organism forms the mucus and aids in locomotion.—The "mucosomes" are in some forms zymogens and in the case of pathogens, the toxinogens.—*Oran Raber.*

4428. Aubaret, Rouslacroix, et Herrmann. **Un cas de pasteurellose de la conjonctive.** [**A Pasteurellose of the conjunctiva.**] Compt. Rend. Soc. Biol. 89: 1286–1287. 1923.—From the conjunctiva of a woman was isolated a coccobacillus having all the cultural characters of the organism causing Pasteurellose in chickens (the woman had been caring for some diseased fowls). This is one of the first cases of human pasteurellose. Cultural characters are given.—*Oran Raber.*

4429. Fred, E. B., and O. C. Bryan. **The formation of nodules by different varieties of soy beans.** Soil Sci. 14: 417–420. 1922.—No evidence was found by the authors to indicate that the nodule bacteria of different varieties of soybeans are specific. The bacteria from one variety will readily infect another.—*W. J. Robbins.*

4430. Levine, Max, and Claire S. Linton. **Differentiation of human and soil strain of the aerogenes section of the colon group.** Amer. Jour. Public Health 14: 95–99. *2 fig.* 1924.—In a collection of 123 bacterial cultures of the aerogenes section of the colon group, comprising 47 human fecal strains and 76 soil strains, 2 distinct groups were evident: (1) a group considered as the cloacae type, the members of which do not ferment glycerol, are actively motile, practically always liquefy gelatin, and very rarely attack carbohydrates; and (2) a group representative of the aerogenes type, the members of which attack glycerol vigorously, do not liquefy gelatin, are non-motile, and frequently attack carbohydrates. A few cultures, possibly mixtures, were intermediate in their characters.—Adonitol non-fermenting strains of group 2 were found only in the soil. Of the adonitol positive strains the soil and human strains could be differentiated in all but 3 cases on the characters of fermentation of melezitose, inulin, glycogen, and dulcitol, and the production of indol.—*C. A. Ludwig.*

4431. Lwoff, Andre. **Nature et position systématique du bactéroide des blattes.** [**Nature and systematic position of the bacteroid of cockroaches.**] Compt. Rend. Soc. Biol. 89: 945–946. *1 fig.* 1923.—Evidence is given, especially the formation of cross walls, that the bacteroids found in cockroaches are not cell products but bacteria of the species *B. cuenoti* Mercier.—*Oran Raber.*

4432. Riegler, P. et G. Iriminoiu. **Un cas de pasteurellose chez le singe.** [**A case of Pasteurellose in a monkey.**] Compt. Rend. Soc. Biol. 89: 908–910. 1923.—A form isolated from a monkey has all the characters of a Pasteurella. Cultural characters are given.—*Oran Raber.*

4433. Sierakowski, Stanislaw. **Micro-méthode rapide pour la détermination et l' isolement des bactéries pathogènes.** [**A rapid microtechnique for the determination and isolation of pathogenic bacteria.**] Compt. Rend. Soc. Biol. 89: 1002–1006. 1923.—Microscopic methods and microchemical technique are described for the determination and isolation of pathogens. While the ordinary methods demand 18–20 hours for a determination, the methods described require only 8–10 hours.—*Oran Raber.*

4434. van Saceghem, René. **Milieu de culture à la gomme arabique.** [Culture medium with gum arabic.] Compt. Rend. Soc. Biol. 89: 968. 1923.—A medium with gum arabic added is reported as favoring the growth of *Pasteurella* and *Salmonella*. Gum tragacanth had been previously reported as favorable for *Gonococcus*. The value of gum arabic is thought to be due to the humidity and viscosity which it gives the medium.—*Oran Raber*.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. Berry, *Editor*

(See also in this issue Entries 4164, 4168, 4347)

4435. Berry, Edward W. **The age of the supposed Lower Cretaceous of Alabama.** Jour. Washington Acad. Sci. 13: 433–435. *Fig. 1–6.* 1923.—*Cycadinocarpus circularis* Newb. (?), *Dammara borealis* Heer, *Diospyros primaeva* Heer (?), *Inga* cf. *cretacea* Lesq., and *Salix flexuosa* Newb., all well known Upper Cretaceous species, are reported from Old Fort Decatur on Tallapoosa River in Alabama, from beds that have been considered to be of Lower Cretaceous age. —*E. W. Berry.*

4436. Carpentier, A. **Observations sur des fructifications de genre Sphyropteris Stur. et de genre Boweria Kidston.** [Observations on the fructifications of the genera Sphyropteris and Boweria.] Rev. Gén. Bot. 35: 481–485. *Pl. 10–11.* 1923.—In a fossil from Herin (North) at a level corresponding to subdivision A^2 of R. Zeiller, annulated sporangia of ferns of the genus *Boweria* were found. Some microsporangia (?) of the genus *Sphyropteris* with the superficial net well preserved and showing 2 kinds of meshes were discovered in the same layer. A sterile Sphenopteris of Vicoigne (North) is identical or nearly so with the foliage of *Sphyropteris frankiana* Gothan. The genus *Boweria* is connected with ferns; it is probable that the Sphyropteris are Pteridospermeae, the seeds of which are as yet unknown.—*J. C. Gilman.*

4437. Доктуровскій, В. С. [Docturovsky, V. S.] **Ботаническій анализъ торфа. Лабораторные методы изслѣдованія.** [Botanical analysis of peat. Laboratory methods.] Вѣстникъ торфяного Дѣла [Reports on Peat.] 3. 1914. [With French summary.]

4438. Доктуровскій, В. С. [Docturovsky, V. S.] **О нѣкоторыхъ особенностяхъ строенія болотъ средней Россіи.** [Some details of the structure of the moors of middle Russia.] Работы Торфяной Академіи [Contribution of the Peat Academy] 1. 1920.—The author describes a raised bog situated near the town of Lichoslawl in the province of Twer. The layers found are: (1) young sphagnum peat, Subatlantic period; (2) limiting horizon, Subboreal period; (3) old sphagnum peat, Atlantic period; (4) alder-birch peat, Boreal period. The degree of disintegration in (1) is about 30%, and in (2) about 80%. In (3) it is 52% at the top and 70–80% at the bottom, while in (4) it is almost 100%. Under the limiting horizon is a layer of slightly disintegrated peat on which the large stumps of the limiting horizon rest. This layer often causes irregularities in the peat layers. Geologically this phenomenon is explained as follows: the dry Subboreal period came on so suddenly that the upper layer of the old sphagnum peat had not time to disintegrate, and only a very thin superficial layer disintegrated; but in the deeper layers of the bog, on account of their greater age and the influence of erosion, disintegration went much farther.—*V. Docturovsky.*

4439. Доктуровскій, В. С., и В. Кудряшевъ. [Docturovsky, V. S., and V. Kudriaschev.] **Нѣкоторые результаты изученія русскихъ торфяныхъ ъболотъ.** [Results of Russian studies on peat moors.] Вѣстникъ торфяного Дѣла [Reports on Peat] 4. 1918/20.—Docturovsky describes a raised sphagnum bog (Sphagnum-Hochmoor) in the peat area near Chudovo station 103 versts from Petersburg. The author finds a layer of young sphagnum peat 2–3 m. thick, then a limiting horizon (Grenzhorizont) 20–30 cm. thick containing pine stumps, then an older layer of sphagnum peat 3 m. thick, and under this a foundation layer of peat formed from *Carex*, *Hypnum*, and *Sphagnum* ½–1½ m. thick. In some places the limiting horizon is present as merely a "contact line" (Kontaktlinie) between the old and the new layer of peat, in the sense in which L. v. Post uses that term. In the peat layers pine pollen is present in an abundance of 2–3 on the 10 part scale used by v. Post, and this is an indication that the pine in Russia is not geologically old, as in Sweden.—This peat bog has been formed by a

formerly dry area becoming swampy. Bog formation in Russia is coextensive with the formation of lakes. The author, in agreement with Blytt and Sernander, assigns the young sphagnum peat to the subatlantic period, the limiting horizon to the subboreal, the old sphagnum peat to the Atlantic, and the Hypnum-Carex peat to the boreal.—The author has investigated several bogs in the vicinity of Pskow. The limiting horizon is here present as merely a contact line between the old and the young layer of peat. The pine pollen here has a grade of nearly 5. Bogs of the raised type are here found by the side of sinks (Karstlöchern) in limestone, where the excess water is drained off as if through drainage channels, especially where the water is drained off through channels from each bog into the next sink. The work is illustrated with drawings and diagrams.—Kudriaschev has worked out the following method of analyzing peat samples. The samples were obtained with a Hill sampler, and each sample divided into 2 equal parts by weight; one half was air dried in a drying oven, and the other was washed through a sieve of 0.25 mm. mesh. The portion of the latter sample remaining on the sieve was then analyzed botanically (without loss of weight) and afterward dried in a drying oven. The weight of this portion was then divided by the weight of the first sample and the result as a per cent was substracted from 100, the per cent of disintegrated material being thus obtained. This method has some disadvantages, one of which is that, besides the disintegrated material, some particles that are not disintegrated, but whose diameter is less than that of the meshes of the sieve pass through. By this means the degree of disintegrationof the various kinds of peat forming the different layers of the bogs was determined. The well decayed mass of peat where it was 1½–2 m. thick always showed the limiting horizon, which was always confirmed by the finding of stumps at this depth. In those bogs that showed no layers of peat, the method of washing the material through a sieve served to determine the limiting horizon. In this way the limiting horizon of the bogs of Moskow, Rjasan and Mogilev was determined. A series of profiles illustrate the conclusions of the authors.—*V. Docturovsky.*

4440. Erdtman, Gunnar. **Two new species of Mesozoic Equisetales.** Ark. Bot. 17³: 1–6. *Pl. 1.* 1921.—*Equisetites intermedius* is described from the Rhaetic of Höganäs in Scania and *Neocalamites Nathorstii* from the Jurassic of Whitby Yorkshire, the latter extending the known range of *Neocalamites* from the Triassic to the middle Jurassic.—*E. W. Berry.*

4441. Fritel, P. H. **Remarques sur la flore quaternaire du Midi de la France et des environs de Paris. [The Quaternary flora of the South of France and the vicinity of Paris.]** Bull. Mus. Hist. Nat. [Paris] 26: 685–689. 1920.—A list of material from the collection of de Saporta from Trets, in Aix (Bouches-du-Rhône), is given. Of the 24 species in this list 6 are new to the Quaternary flora of France: *Berberis vulgaris* L., *Pistacia terebinthus* L., *Eleagnus angustifolius* L., *Rhamnus alaternus* L., *Amelanchier vulgaris* Michx., and *Sorbus domestica* L. De Saporta's specimens are from the St-Antonin beds. In the tufas of Pigeonnier, near Aix, *Salix cinera* L. is the predominant species. *Corylus avellana* and *Laurus nobilis* have been found in the Trans beds, in Draguignan (Var). Among the specimens in the Museum not previously reported upon are: *Salix incana* Schr., *Acer opulifolium* Will., *Sorbus domestica* L., and *Papaver somniferum* var. *nigrum* L. in the Aygalades beds near Marseille; *Clematis vitalba*, *Phyllirea media*, and *Acer opulifolium* in the Meyrargues formation (Bouches-en-Rhône); and a species of *Itex* from the tufas near Montpellier. The flora of the quaternary tufas of Montigny, near Vernon, in the Paris Basin, is represented in the Museum by the following specimens: *Scolopendrium officinale* Smith., *Alnus* sp., *Ulmus campestris* Sm., *Fraxinus excelsior* L., *F. e.* L. forma *oxyphylla* Bieb., *Acer pseudoplatanus* L., *Buxus sempervirens* L., *Hedera helix* L., *Clematis vitalba* L., and *Salix incana* Schr.—*John M. Fogg, Jr.*

4442. Goldring, W. **The Upper Devonian forest of seed ferns in eastern New York.** New York State Mus. Bull. 251. *50–92, pl. 1–11, fig. 7.* 1924.—The author describes the Devonian forests of Gilboa, Schoharie County, New York, which occur at 3 levels. Some of the stumps have been imperfectly known for over 50 years, and were quite incorrectly described as *Psaronius* by William Dawson. Recent collections by the New York State Museum have brought together in that institution a remarkable collection of stumps, roots, fronds, seeds and microsporangial organs. These have not been found in organic connection, but the circumstantial evidence is rather convincingly in favor of such a relationship and of the restoration which forms plate 1 of Miss Goldrings' contribution. These Devonian seed ferns are

referred to a new genus, **Eospermatopteris,** and the various classes of remains are described and illustrated in great detail. These trees had slender tapering trunks that give evidence of secondary thickening. One of the largest is 3½ feet in diameter at the greatly expanded butt. The standing trunks are all broken off some 3 feet or less above the base, but broken portions up to 12 feet in length have been found, and the actual height is estimated as at least 30–40 feet. Bases of the fronds are found attached to the trunk in 1 specimen. The roots are unattached but common in the under clay in which the stumps are rooted. The fronds are tripinnate, 8 feet or more in length and with finely divided laminae of the Sphenopteridium type. The seeds were borne in pairs at the summits of modified pinnules, distally on the fronds. They are somewhat ovate in form and completely invested by cupules. The microsporangia are likewise borne at the tips of forking branchlets. They are compared with those of *Crossotheca,* and are funnel or saucer-shaped with scars supposed to mark the places of attachment of the sporangia.—*E. W. Berry.*

4443. Halle, T. G. **On the sporangia of some Mesozoic ferns.** Ark. Bot. 17[1]: 1–28. *Pl. 1–2, fig. 1.* 1921.—A fertile specimen, *Danaeopsis fecunda,* is described, showing that this Rhaetic species is much more like the modern *Archangiopteris* than it is like *Danaea.* Specimens of *Ruffordia Goepperti* from the Jurassic of Manchuria are shown to have an apical annulus, thus confirming the reference of *Ruffordia* to the Schizaeaceae. *Cladotheca undans* (L. & H.) Halle from the Jurassic of Yorkshire shows characters similar to those of the genus *Todites.* It is shown that the well known *Dictyophylum exile* (Brauns) Nathorst had a much larger output of spores per sporangium than the existing Dipteriaceae or Matoniaceae, and the author proposes the use of the provisional family name Camptopteridinae of Nathorst for this form. Specimens of the Jurassic *Hausmannia Forchhammeri dentata* Möller showing some of the sporangial characters and spore output are described, and it is concluded that this genus is related to the family Dipteriaceae. The output of spores in the Rhaetic species *Thaumatopteris Schenki* Nathorst is also described.—*E. W. Berry.*

4444. Kozlowski, Roman. **A propos de l'age du soulévement de la Cordillère de Bolivia. [On the age of elevation of the Bolivian Andes.]** Bull. Soc. Géol. France 23: 57–61. 1923.—In this paper, the main thesis of which is geological, the author describes petrified wood from the high plateau of Bolivia at Chacarilla belonging to the family Cacsalpiniaceae and entirely lacking evidences of seasonal changes. This wood is from the Vetas formation and Pliocene in age, and tends to confirm the conclusions of Berry and Singewald regarding the recency of elevation of the Andes.—*E. W. Berry.*

4445. Krenkel, E. **Moorbildungen im tropischen Afrika. [Peat formation in tropical Africa.]** Centralbl. Min. Geol. u. Paläont. 1920: 371–380, 429–438. 1920.—There is so much misapprehension, particularly among geologists, that peat formation is a matter of cool climates, that the present account of the peat bogs in the Tanganyika region of Africa is of interest. There is given a classification of bogs and a list of the various types of bogs known to the author in Africa, and useful references to the literature of tropical peat bogs.—*E. W. Berry.*

4446. Rudolph, Karl, und Franz Firbas. **Pollenanalytische Untersuchungen böhmischer Moore. [Pollen analyses of Bohemian bogs.]** Ber. Deutsch. Bog. Ges. 40: 393–405. *Fig. 1.* 1922.—This is a report of numerous pollen analyses of several postglacial Bohemian bogs. A brief description is given of the method employed to determine the pollen composition of the different layers of the bogs. The lower layers contained pollen mostly of *Betula* and *Pinus* with a small percentage of pollen of *Corylus* and *Tilia.* In the upper layers *Corylus* was most common; *Pinus* was less common than in the lower layers. Small percentages of pollen of the following genera were also found: *Carpinus, Fagus, Quercus, Ulmus,* and *Salix.*—*W. C. Muenscher.*

4447. Swinnerton, H. H. **Outlines of palaeontology.** *x + 420 p.* Edward Arnold & Co.: London, 1923.

4448. Wolff, Max, und Anton Krausse. **Entomologische Mitteilungen. Wirklicher und vermeintlicher Insektenfrass an einem fossilen Holz. [Entomological contributions. Real and apparent insect damage in fossil wood.]** Zeitschr. Forst.- u. Jagdw. 54: 548–549. *Fig. 1–6.* 1922.—Four cases of insect and 2 of fungus damage to pieces of *Taxodioxylon* sp. from the "Marga" mine of the Senftenberg lignite coal district are briefly described.—*J. Roeser.*

PATHOLOGY

Frederick V. Rand, *Editor*

Lillian C. Cash and Harry Braun, *Assistant Editors*

(See also in this issue Entries 4066, 4072, 4074, 4079, 4089, 4102, 4106, 4108, 4112, 4130, 4148, 4183, 4192, 4195, 4199, 4200, 4202, 4205, 4206, 4250, 4269, 4271, 4272, 4289, 4295, 4297, 4300, 4314, 4319, 4338, 4340, 4378, 4379, 4380, 4384, 4386, 4388, 4389, 4390, 4391, 4393, 4395, 4396, 4397, 4399, 4401, 4406, 4409, 4410, 4411, 4412, 4413, 4414, 4415, 4420, 4421, 4423, 4428, 4429, 4432, 4433, 4448,4636, 4638, 4643, 4652, 4657, 4676, 4680, 4681, 4685, 4686, 4723, 4726, 4728, 4729, 4731, 4733, 4734, 4735, 4739, 4742, 4743, 4744, 4745, 4748, 4753, 4755, 4756, 4757, 4765, 4768)

DISEASES CAUSED BY FUNGI

4449. Adamson, N. J. **Early spraying for apple and pear black-spot.** New Zealand Jour. Agric. 27: 26–27. *6 fig.* 1923.—This includes descriptions and illustrations of the stages of development at which various spray applications should be made.—*N. J. Giddings.*

4450. Allen, Ruth F. **Cytological evidence of physiologically distinct forms in Puccinia graminis tritici.** [Abstract.] Phytopathology 14: 39–40. 1924.

4451. Anderson, P. J. **Susceptibility of species of Allium to onion smut.** [Abstract.] Phytopathology 14: 26. 1924.

4452. Atanasoff, D. **Fusarium blight of the cereal crops.** Mededeel. Landbouwhoogeschool Wageningen 27[4]: 1–132. *6 pl., 1 fig.* 1923.—Cereal crops (wheat, rye, barley, oats, spelt) and some grasses are attacked by several species of *Fusarium*. Frequently the same Fusarium species will cause 2 distinct pathologic conditions in each of the above named crops. The 1st affects the underground portion causing seedling blight and later foot-rot on the full-grown plant. The 2nd condition, found on fully grown plants above ground, causes rotting of the nodes on rye, wheat, and barley, or blighting of the heads of wheat, rye, barley, and spelt, and sometimes of oats and other grasses. The disease decreases the percentage of germination and causes dying-off and weakening of the young seedlings in fall or spring, wilting and dying of full grown plants and partial or entire blighting of the heads. The Fusarium species which are described as cereal pathogenes produce in all cases similar pathogenic conditions. The writer discusses in detail *Gibberella Saubinetii*. Production of conidia is more or less common in all forms of Fusiaruim attack on cereals and on dead organic matter from fields where the preceding year's crop has been heavily infested. It was demonstrated that the hyphae present in the previously infected heads or stalks remain viable until spring when they form new conidia. The perithecia are produced in great numbers on all infected parts on which there has been more or less formation of conidia. Ascospores play an important rôle as the most certain inoculum for the 1st infection. Dissemination of spores by wind and rain is described. No definite incubation period on seedlings can be given. First symptoms of root infection appear under greenhouse conditions about the 7th day after planting. On heads in damp weather the period is 3–6 days; in dry weather symptoms of infection may not appear until after rain or heavy dew. The rate of spread from the point of infection is not uniform, depending upon the individual host and upon weather conditions. The 1st head-blight infection takes place in nature during the latter part of the blossoming period. The fungi are remarkably resistant to desiccation and low temperatures and it is supposed that species introduced with winter crops overwinter in the soil as mycelium, conidia and chlamydospores (*Gibberella Saubinetii, Fusarum herbarum, F. avenaceum, F. culmorum,* and *F. arcuosporum*). Methods of isolation and culture methods and artificial infection are described in detail. It is evident that not only does a systemic invasion of cereal crops by Fusarium species not take place, but this is theoretically impossible as it presupposes a higher degree of parasitism and specialization than these organisms possess. As control measures are mentioned: (1) well prepared land, (2) clean land, (3) crop rotation, (4) healthy seed, (5) resistant varieties, and (6) prompt thrashing and storage of harvested grain. There are 295 literature citations.—*J. C. Th. Uphof.*

4453. Brentzel, W. E. **Further investigations on the pasmo disease of flax.** [Abstract.] Phytopathology 14: 48–49. 1924.—Lesions are produced on stems, leaves and capsules by *Phlyctaena linicola* Speg.—*B. B. Higgins.*

4454. Cavadas, D. **Sur la biologie de Vermicularia varians Duc. [The biology of Vermicularia varians.]** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland 1923: 181–183. 1923.—Conidia or sclerotia of *Vermicularia varians* applied either to the soil or to the seed potato on planting produced a vascular wilt. The first evidence of disease appeared when the plants were 10–15 cm. high; the stems were abnormally tall and slender and the leaves curled; later the leaves turned pale, drooped, and dropped off and finally the stem collapsed. The melanconiaceous stage of *Vermicularia* appeared as small black dots at the point where the stem had bent over. When conidia were inoculated into the base of potato stems 8–12 cm. high only local effects were produced; sowing conidia and sclerotia on uninjured plants at this stage of development was without result. It is concluded that *V. varians* acts as a true parasite if it infects the tuber at the time of sprouting; at later stages it can become destructive only when external influences diminish the resistance of the host.—*Philip Brierley.*

4455. Ciferri, R. **Su di un cancro del "Ficus elastica." [A canker of Ficus elastica.]** Riv. Patol. Veg. 13: 85–89. *2 fig.* 1923.—A new canker on *Ficus elastica* Roxb. is recorded from Torino, Italy, caused by *Volutella Petrii* n. sp. Cankers were caused by inoculation on 2 trees and the fungus was grown in pure culture.—*F. M. Blodgett.*

4456. Cook, Mel. T., and Rafael A. Toro. **A Sclerotium disease of Yautia.** [Abstract.] Phytopathology 14: 29. 1924.

4457. Coons, G. H. **Varietal resistance of winter wheats to Tilletia levis.** [Abstract.] Phytopathology 14: 38–39. 1924.

4458. Craigie, J. H., and William H. Weston, Jr. **Observations on malformed tassels of teosinte plants infected with downy mildew.** [Abstract.] Phytopathology 14: 49. 1924.—Malformations in *Euchlaena mexicana* are produced by *Sclerospora philippinensis.*—*B. B. Higgins.*

4459. Cunningham, G. H. **Black-rot (Physalospora cydoniae Arnaud). A fungous disease of apple, pear, and quince.** New Zealand Jour. Agric. 27: 95–102. *7 fig.* 1923.—The black rot is comparatively unimportant in New Zealand. It attacks only apple, pear and quince. The symptoms on fruit, leaves, and twigs are described. Control measures are suggested.—*N. J. Giddings.*

4460. Cunningham, G. H. **Diplodia canker, Diplodia Griffoni. A common fungous disease of the apple.** New Zealand Jour. Agric. 27: 380–384. *5 fig.* 1923.—A Diplodia canker of apple has commonly been confused with the black-rot canker, though the symptoms differ somewhat. The Diplodia causes a fruit rot but no leaf injury. Infection is through wounds and often seems to be associated with woolly aphis. This disease is less important than black-rot and is not particularly serious.—*N. J. Giddings.*

4461. D., W. D. **Potatoes—experiments conducted in 1922, with varities immune from black scab or wart disease.** Jour. Dept. Agric. Ireland 22: 381–385. 1923.—The desirability of certain immune varities is discussed.—*Donald Folsom.*

4462. Davis, W. H. **Summary of investigations on clover rusts.** [Abstract.] Phytopathology 14: 33. 1924.

4463. Dickson, James G., Sophia H. Eckerson, and Karl P. Link. **Studies on predisposition of wheat and corn to seedling blight caused by Gibberella Saubinetii.** [Abstract.] Phytopathology 14: 34. 1924.

4464. Dickson, James G., Sophia H. Eckerson, and Karl P. Link. **The nature of resistance to seedling blight of cereals.** Proc. Nation. Acad. Sci. [U. S. A.] 9: 434–439. *4 fig.* 1923.—This disease is due to *Gibberella Saubinetii* (Mont.) Sacc. which grows normally in pure cultures at temperatures of 3–32°C., the optimum being about 24–28°C. Wheat seed produce more uniform and stronger plants at 8–16°C. than at higher temperatures; the seedlings contain more sugar, have more cellulose in their cell walls, and have more cutinization of the epidermis, than at higher temperatures. Corn (maize) seed germinate best at 24–28°C., and much less well below 20°; the growing embryo contains more sugar at the higher

temperatures. The fungus attacked corn most severely at the lowest temperature (8°C.) used in the authors' tests, while wheat was not attacked at all below 10°C. and was injured most severely near 28°C. Plainly, temperature affected resistance here by its effect on the growth of the host, especially on the character of the cell walls. Low soil moisture favored infection of both wheat and corn; similar results were secured with sub-optimal illumination. The influence of the environment on the metabolism of both host and parasite must be studied. —*Howard B. Frost.*

4465. Dietz, S. M. **Epidemiology studies with Puccinia coronata Corda.** [Abstract.] Phytopathology **14**: 41. 1924.

4466. Fant, G. W. **Spraying experiments for control of pear leaf and fruit spot.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 548–551. 1921/22 [1924].—Commercial lime-sulphur gave more efficient control of *Fabraea maculata* than did self-boiled lime sulphur. The former spray material produced some foliage burning. Best control was obtained on the blocks receiving late spray applications.—*Wm. H. Martin.*

4467. Fant, G. W. **Spray vs. dust in controlling the diseases of apples.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 551–553. 1921/22 [1924].—Applications of 80–10–10 dust following the pink bud spray gave approximately as good control of scab as did spraying with commercial lime-sulphur and atomic sulphur.—*Wm. H. Martin.*

4468. Fant, G. W. **The brown rot canker and twig blight of the peach.** Ann. Rept. New Jersey Agric. Exp. **43**: 547–548. 1921/22 [1924].—The spores of the brown rot fungus from peach mummies proved viable in the spring. Spores were found to be produced when the blossoms are in the pink bud stage. Histological studies showed that the growth of the pathogene is practically confined to the region just external to the cambium.—*Wm. H. Martin.*

4469. Filler, E. C. **Controlling white pine blister rust in the Northeastern [U. S. A.] States.** [Abstract.] Phytopathology **14**: 53. 1924.

4470. Freeman, E. M., and L. W. Melander. **Simultaneous surveys for stem rust: A method of locating sources of inoculum.** [Abstract.] Phytopathology **14**: 40. 1924.

4471. Gardner, Max W. **Origin and control of apple-blotch cankers.** Jour. Agric. Res. **25**: 403–418. *3 pl.* 1923.—Evidence that the majority of the apple-blotch cankers on bearing wood under central Indiana conditions result from leaf-petiole infection is as follows: (1) the majority of such cankers are located at leaf scars; (2) such cankers become visible in the fall or in the spring of the 2nd year—too late to be attributed to spore infection; (3) basal petiole lesions are very abundant; (4) visible twig invasion from basal petiole lesions is occasionally noted; (5) leaf-scar cankers appear where infected petioles were attached; (6) the presence of the fungus in apparently healthy tissues of the petiole 1–3 mm. above and below the visible margins of a lesion and in apparently healthy leaf-scar tissues below basal petiole lesions was proved culturally. Cankers between scars resulting from direct spore infection are common on suckers, watersprouts, and nursery stock. There are in addition 2 other types of canker represented by twig invasion from bud scales and limb invasion from short spurs. The fungus (*Phyllosticta solitaria* E. & E.) was found alive in cankers 7 and 8 years old. Dormant sprays and dusts were ineffective in canker control. The Bordeaux sprays which control fruitinfection successfully prevented petiole infection and as a consequence twig infection and canker formation. Lime sulphur was not as reliable as Bordeaux. Spraying every year regardless of crop is therefore essential. Evidence that the disease is introduced into orchards with the nursery stock is deduced from the facts that (1) old trees show perennial individuality in the degree of canker infection; (2) in very young orchards not all trees and frequently only a small percentage are infected; (3) there is little evidence of long distance spore dissemination; (4) cankers were found in abundance on seedlings and nursery stock. A campaign to eliminate the disease from certain young orchards by (1) annual application of the blotch sprays to prevent new cankers and (2) eradication of all old cankers by pruning out spurs and smaller limbs and by shaving the cankers from the larger limbs, has been instituted. The cankers are shallow and can be shaved off with a sharp pocketknife in the early spring without injury to the cambium. The wounds become mere surface scars. No wound dressing is necessary.—*Author.*

4472. Gloyer, W. O. **Fungous diseases of the China aster.** [Abstract.] Phytopathology **14**: 64. 1924.

4473. Gloyer, W. O., and H. Glasgow. **Effect of the mercuric chloride treatment for maggot on Rhizoctonia and club-root of cabbage.** [Abstract.] Phytopathology **14**: 25. 1924.

4474. Griffiths, Marion A. **Physiological studies on flag smut of wheat.** [Abstract.] Phytopathology **14**: 39. 1924.

4475. Haenseler, C. M. **A new peach wilt disease.** [**Verticillium sp.**] Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 568. 1921/22 [1924]. [See Bot. Absts. 11, Entry 4344.]

4476. Holbert, J. R., Benjamin Koehler, and G. H. Dungan. **Studies on the Diplodia disease of corn.** [Abstract.] Phytopathology **14**: 47. 1924.

4477. Humphrey, C. J. **Decay of lumber and building timbers due to Poria incrassata (B. & C.) Burt.** Mycologia **15**: 258–277. *Pl. 28–30.* 1923.—"The decay due to *Poria incrassata* is quite similar to that produced by *Merulius lachrymans* and has probably been frequently confused with it. * * On the whole it is of greater economic importance than any of the members of the *Merulius* group in the United States." A discussion of the nomenclature relating to this fungus is followed by an elaborate description of its morphology including variations due to different habitats. The fungus was grown in pure cultures, one of the media used being malt-extract agar, the formula for which is given. Effect of temperature on mycelial growth was studied, 28°C. appearing to be the optimum. The action of the fungus on various woods, representing 13 genera of conifers and 25 of broad-leaf trees, has been tested in 2-l. Erlenmeyer-flasks cultures; tables show the loss in weight of the various woods. The data show that this fungus is "an omnivorous saprophyte which is capable of attacking and destroying almost all of the commercial woods of the United States." Under "Economic Features" information is given on decay in lumber sheds and stored timber as well as decay in buildings. Control measures including prevention and eradication are presented.—*H. R. Rosen.*

4478. Hungerford, Charles W. **Studies on the life history of stripe rust, Puccinia glumarum (Schm.) Erikss. & Henn.** Jour. Agric. Res. **24**: 607–620. *4 pl., 1 fig.* 1923.—It has been shown that *Puccinia glumarum* Erikss. and Henn. may over-winter on the Pacific coast and in the inter-mountain region, both as mycelium and as urediniospores, on wheat and wild grasses (*Hordeum nodosum* L., *H. jubatum*, *Bromus marginatus* Nees, *Elymus glaucus* Buckl.) The rust passes the dry summer months as mycelium within the leaves of wild grasses (*Elymus canadensis* and the above named species). The summer is the critical time for the survival of the rust in the semi-arid regions of the west. Urediniospores on wheat leaves kept in herbarium packets remained viable for 58 days. Urediniospores of *P. glumarum tritici* did not prove as resistant to drying as those of *P. graminis avenae*, *P. triticina*, or *P. holcini*. Infection by the uredinial stage of stripe rust cannot take place until the primary leaf has begun to expand. The period of incubation for *P. glumarum tritici* proved to be 9–30 days, depending on temperature and sunlight. In certain wheat varieties kernel infection is very common; when severe it may materially reduce the germinating power of the seed. Carefully controlled experiments showed that stripe rust is probably not transmitted by means of seed wheat. On plants grown from infected seed in the field, infection appeared no sooner than upon other plants grown from clean seed. Over 4,700 plants were grown from infected seed in a specially constructed greenhouse room; no rust appeared on any of them at any time. The conclusion drawn is that stripe rust evidently is not transmitted from one wheat crop to the next by means of infected seed wheat.—*Author.*

4479. Johnson, A. G., R. W. Leukel, and J. G. Dickson. **New seed treatments for controlling stripe disease of barley.** [Abstract.] Phytopathology **14**: 42. 1924.

4480. Johnston, C. O. **Wheat bunt investigations in Kansas.** [Abstract.] Phytopathology **14**: 37. 1924.

4481. Johnston, C. O., and L. E. Melchers. **Fungicidal treatments for the control of sorghum kernel smut.** [Abstract.] Phytopathology **14**: 44. 1924.

4482. Keitt, G. W., and L. K. Jones. **Seasonal development and control of apple scab and cherry leaf spot in relation to environment.** [Abstract.] Phytopathology **14**: 36. 1924.

4483. Keitt, G. W., and L. K. Jones. **Sepal infection in relation to seasonal development and control of apple scab.** [Abstract.] Phytopathology **14**: 36. 1924.

4484. Kendrick, James B. **Infection-court in radish black-root.** [Abstract.] Phytopathology **14**: 66. 1924.—This refers to the disease produced by *Rheosporangium aphanidermatus* Edson.—*B. B. Higgins.*

4485. Kirby, R. S. **Comparative efficiency of formaldehyde, copper-carbonate dust and sulphur dust in controlling smuts in hulled oats.** [Abstract.] Phytopathology **14**: 42–43. 1924.

4486. Leach, Julian G., and J. L. Seal. **Powdery mildew of raspberries.** [Abstract.] Phytopathology **14**: 61. 1924.

4487. Ludwig, C. A. **Studies of anthracnose infection in cotton seed.** [Abstract.] Phytopathology **14**: 52. 1924.

4488. McKinney, H. H. **Influence of soil temperature and moisture on infection of wheat seedlings by Helminthosporium sativum.** Jour. Agric. Res. 26: 195–218. *4 pl., 6 fig.* 1923.—The present status of the *Helminthosporium* disease of wheat is discussed briefly. It is pointed out that the disease causes considerable damage under certain conditions especially in the spring-wheat region. It is pointed out that no proof has yet been given to show that the rosette disease of wheat is caused directly by *Helminthosporium sativum* as claimed by certain workers. Greenhouse experiments were conducted to determine the influence of soil temperature on the occurrence of the disease on the underground portions of young plants of Harvest Queen (winter) wheat, Marquis (spring) wheat, and Hanna barley. It was found that the optimum soil temperatures for infection are 32, 28, and 28°C. for Harvest Queen and Marquis wheat and for Hanna barley, respectively. Observations are also recorded on the effect of soil temperature on speed of seed germination, stature and dry weight of plants, percentage of seed germination, tillering, and position of crown and permanent root system with respect to the seed and soil surface. An experiment was conducted to determine the influence of regulated alternating soil temperatures on the development of infection, as compared with the influence of constant soil temperatures equivalent to the maximum, mean and minimum temperatures of the alternating series. It was found that the results obtained at the constant mean soil temperature were essentially the same as those produced by the alternating series. It was also found that fairly high soil moistures favor infection at the higher soil temperatures, whereas at low soil temperatures the lower soil moistures become more favorable for infection. The soil temperature optimum was not altered by variations in soil moisture. Field experiments were carried out and it was found that early-sown winter wheat is more severely infected than late-sown wheat.—*Author.*

4489. Mains, E. B. **Wheat resistant to mildew, Erysiphe graminis.** [Abstract.] Phytopathology **14**: 48. 1924.

4490. Martin, Wm. H. **Late blight of potatoes and the weather.** New Jersey Agric. Exp. Sta. Bull. 384. *23 p., 2 fig.* 1923.—In 18 of the 34 years since 1889 late blight of potatoes (*Phytophthora infestans*) has been present in New Jersey. During 16 of 34 years the the combined rainfall for the months of June, July, August and September was above the average and blight was present in 13 of these 16 years. There were 18 years when the temperature for these 4 months was below the 34-year average, and in these years blight was reported as being present in 12 and absent in 6 years. A correlation of the combined influence of temperature and rainfall with the prevalence of blight indicates that the influence of these 2 factors in the months of June, August or September has less weight in determining an outbreak of late blight than has a combination of the same factors in July alone. The result of a correlation of the various factors indicates that in New Jersey when the temperature for the month of July is below 74°F. and the rainfall above 4.74 inches, conditions are produced that are likely to result in an epidemic of late blight.—*Author.*

4491. Martin, Wm. H. **Studies on tomato leaf-spot control.** New Jersey Agric. Exp. Sta. Bull. 345. *43 p., 1 pl.* 1920.—Leaf-spot of tomatoes caused by *Septoria Lycopersici* Speg. appears in the field about July 1. These studies indicate that the causal organism may be disseminated by insects, wind, water and pickers. In spraying experiments, good control of leaf spot followed the use of Bordeaux-soap and copper-soap mixtures. While the control

following the use of Bordeaux mixture (4-4-50) was not as good as in the case of the 2 soap mixtures, plots sprayed with this material gave the greatest increase in yield over the checks. On the sprayed plant the ripening processes were delayed, due probably to the preservation of the foliage. Under certain conditions the advisability of spraying late maturing varieties of tomatoes is questionable.—*Author.*

4492. Melchers, L. E., and C. O. Johnston. **Second progress report on studies of corn seed germination and the prevalence of Fusarium moniliforme and Diplodia Zeae.** [Abstract.] Phytopathology **14:** 45. 1924.

4493. Melchers, L. E., and M. C. Sewell. **The rate of spread of wheat foot-rot in tillage plots in Kansas.** [Abstract.] Phytopathology **14:** 41–42. 1924.

4494. Metcalf, Haven. **Chestnut blight in Europe (Endothia parasitica (Murr.) A. & A.** [Abstract.] Phytopathology **14:** 52. 1924.

4495. Metcalf, Haven. **Observations on the Douglas fir canker (Phomopsis Pseudotsugae Wilson) in Great Britain.** [Abstract.] Phytopathology **14:** 52. 1924.

4496. Monteith, John Jr. **Relation of soil temperature and soil moisture to infection by Plasmodiophora Brassicae.** [Abstract.] Phytopathology **14:** 25. 1923.

4497. Monteith, John Jr. **Relative susceptibility of red clover to anthracnose and mildew.** [Abstract.] Phytopathology **14:** 62–63. 1924.

4498. Moore, W. D. **Spraying experiment for the control of the cherry leaf spot (Cylindrosporium Padi Karst.).** Ann. Rept. New Jersey Agric. Exp. Sta. **43:** 569–572. *Pl. 2–3.* 1921/22 [1924].—Three applications of commercial lime-sulphur (1–40) applied at 3-week intervals beginning as soon as the fruit is picked gave good control of the leaf spot. On unsprayed trees 100% of the leaves had dropped by Sept. 1 as compared with 85, 40–50 and 10% for trees receiving 1, 2, and 3 applications respectively.—*Wm. H. Martin.*

4499. Moore, W. D. **The root and stem rot of the pea.** Ann. Rept. New Jersey Agric. Exp. Sta. **43:** 572–573. 1921/22 [1924]. This disease is generally distributed over the State. The disease first attacks the plant when 8–10 inches high, causing blackening of underground stem portions; later the leaves turn yellow and the plant dies. A species of *Fusarium* was found to be commonly associated with the trouble.—*Wm. H. Martin.*

4500. Neill, J. C. **Stinking-smut of wheat. I. The effect on germination of some seed-disinfectants.** New Zealand Jour. Agric. **27:** 159–167. 1923.—A study of various methods of wheat treatment showed that there was no injury to the grain by copper carbonate used up to 3 ounces per bushel, or anhydrous copper sulphate-calcium carbonate used up to 4 ounces per bushel. Bluestone dip and formalin dip caused injury in some instances, the amount of injury varying somewhat for different varieties.—*N. J. Giddings.*

4501. Orton, C. R., and Otto Olson. **Progress report upon the resistance of commercial strains of tobacco to root-rot.** [Abstract.] Phytopathology **14:** 51. 1924.

4502. Pennington, L. H. **Wind dissemination of aeciospores of Cronartium ribicola Fischer.** [Abstract.] Phytopathology **14:** 52–53. 1924.

4503. Petrescu, C. **Contribution à l'étude biologique de la flore de Moldavie. [Contribution to the biological study of the Moldavian flora.]** Compt. Rend. Soc. Biol. **89:** 686–687. 1923.—Several cases are noted of the rapid equilibrium reached between a parasite and its host plant including *Uromyces striatus* and *Medicago lupulina; Puccinia Arenariae* (Schum.) Winter and *Arenaria serpillifolia* var. *viscidula; Phragmidium Potentillae* (Pers.) Karst. and *Potentilla recta;* and *Uromyces verruculosus* Schroet. upon both *Arenaria serpillifolia* var. *viscidula* and *Lychnis flos-cuculi.* The host produces potent seeds and the parasite its spores, a condition of equilibrium having been reached between the 2. [See also following Entry.]—*Oran Raber.*

4504. Petrescu, C. **Contribution a l'étude biologique de la flore de Moldavie. [Contribution to the biological study of the Moldavian flora.]** Compt. Rend. Soc. Biol. **89:** 1067–1068. 1923.—Further cases of biological equilibrium are noted between *Puccinia Malvacearum* Mont. and *Malva silvestris, M. rotundifolia,* and *M. borealis; Puccinia retifera* Lindr. and *Chaerophyllum bulbosum; Puccinia Chaerophylli* Purt. and *Chaerophyllum temulum;* and *Puccinia bullata* (Pers.) Winter and *Seseli campestre, Silaus besseri* DC., and *Peucedanum latifolium* DC. [See also preceding entry.]—*Oran Raber.*

4505. Poole, R. F. **A new fruit rot of tomato.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 566. 1921/22 [1924].—This is essentially a summary of a paper already abstracted [see Bot. Absts. 12, Entry 2601].—*Wm. H. Martin.*

4506. Posey, G. B., and E. R. Ford. **Survey of blister rust infection on pines at Kittery Point, Me. [Maine], and the effect of Ribes eradication in controlling the disease.** [Abstract.] Phytopathology 14: 53. 1924.

4507. Rose, Jessie P. **Fusarium culmorum var. leteius, a cause of disease in cereals and grasses.** [Abstract.] Phytopathology 14: 50. 1924.

4508. Scott, Irl T. **The influence of hydrogen-ion concentration on the growth of Fusarium Lycopersici and on tomato wilt.** Missouri Agric. Exp. Sta. Res. Bull. 64. *3–32. 10 fig.* 1924.—In 4 experiments with the fungus growing in mineral nutrient solutions of varying reactions there was a limited range of acidity over which the growth was at a minimum within the normal growth range of the organism. Tomato plants were grown in a series of soils with varying reactions obtained artificially by the use of acid or alkali. The seed were inoculated with a spore suspension of *Fusarium Lycopersici* and allowed to germinate and grow under greenhouse conditions favorable for tomato wilt. A minimum of wilting occurred in soils with reactions more or less near those at which growth of the fungus was at a minimum in the cultural experiments, suggesting a possibility of adjusting soils to reactions unfavorable for wilt by proper soil treatments, or that by using soils with natural reactions unfavorable for infection a minimum of wilt would be obtained.—*Author.*

4509. Sherbakoff, C. D. **Common molds of corn seed in relation to yield.** [Abstract.] Phytopathology 14: 46. 1924.

4510. Stakman, E. C. **Barberry eradication prevents black rust in Western Europe.** U. S. Dept. Agric. Dept. Circ. 269. *15 p. 3 fig.* 1923.—Black stem rust of wheat, oats, barley, and rye has been controlled in much of Western Europe by eradicating the common barberry. The author describes conditions as he found them in several countries. The evidence against the barberry is reviewed.—*L. R. Hesler.*

4511. Stakman, E. C., M. N. Levine, and D. L. Bailey. **Biologic forms of Puccinia graminis on varieties of Avena spp.** Jour. Agric. Res. 24: 1013–1018. *4 pl.* 1923.—The authors found that *Puccinia graminis avenae* Erikss. & Henn., supposedly a single biologic form, actually consists of at least 4 forms which can be recognized by their parasitic behavior on 3 varieties of cultivated oats. Forms 1 and 2 appear to be fairly common in Canada, U. S. A., and Mexico. Forms 3 and 4 have not yet been found in North America. Form 3 was obtained from South Africa and form 4 was collected in Sweden. The variety White Tartar (White Russian) which Garber used as the resistant parent in producing an agronomically desirable rust-resistant variety is very resistant to the 2 American forms but not to the South African and Swedish forms. The forms apparently are genetically constant although their development is influenced by light intensity, temperature and the physiologic condition of the host plant.—*Authors' Abstract.*

4512. Stakman, Elvin C., Arthur W. Henry, Gordon C. Curran, and Warren N. Christopher. **Spores in the upper air.** Jour. Agric. Res. 24: 599–606. *2 pl.* 1923.—The authors exposed vaselined microscope slides in the spring and summer of 1921 and 1922 on airplanes flying at various elevations in several regions of the Mississippi Valley in order to obtain data on wind dissemination of cereal rust spores and those of other pathogenic fungi. Numerous pollen grains, spores of rust fungi, *Ustilago, Tilletia, Alternaria, Helminthosporium, Cladosporium, Cephalothecium, Scolecotrichum* and many spores not identified were caught at elevations up to 11,000 feet, but at higher elevations they were relatively scarce. The number caught varied with the length of time and method of exposing the slide. Spores of *Alternaria,* caught at altitudes of 10,500 feet and less, were viable; urediniospores and aeciospores caught at altitudes of 7,000 feet and 1,000 feet respectively also germinated. In the spring of 1922 the number of spores of *Puccinia graminis* in the air decreased rather rapidly with an increase in the distance from areas in which the rust had appeared.—*Authors' abstract.*

4513. Stokdyk, E. A. **Progress report on cabbage yellows investigations in Kansas.** [Abstract.] Phytopathology 14: 24. 1924.

4514. Stover, W. G., and H. W. Johnson. **First progress report on the study of apple scab under Ohio conditions.** [Abstract.] Phytopathology 14: 60. 1924.

4515. Stover, W. G., and Curtis May. **Studies on apple blotch in Ohio.** [Abstract.] Phytopathology **14**: 60. 1924.

4516. Sundararaman, S. **Ustilago Crameri Koern. on Setaria italica Beauv.** Agric. Res. Inst. Pusa Bull. 97. *11 p., 2 pl., 1 map.* 1920 [1921].—This smut causes in some districts a loss of 25%, or 250 pounds per acre. The infection apparently takes place in the young seedling plant. The lower spikelets of infected heads are always diseased, but some of the upper spikelets may be sound. The fungus and the infected host were studied with the microscope. The disease is controlled by soaking the seed for ½ hour in a 2% solution of copper sulphate. Seed was injured by soaking 15–30 minutes in a 5 % solution of copper sulphate, but smut spores were destroyed by soaking for 15–30 minutes in a 0.5 % solution of copper sulphate.—*N. J. Giddings.*

4517. Taubenhaus, J. J. **Studies on Fusarium wilt of spinach in Texas.** [Abstract.] Phytopathology **14**: 29. 1924.

4518. Tims, E. C., and J. C. Walker. **A Fusarium bulb rot of onion.** [Abstract.] Phytopathology **14**: 26–27. 1924.

4519. Tisdale, W. B. **Progress report on Phytophthora-resistant tobacco.** [Abstract.] Phytopathology **14**: 51–52. 1924.

4520. Tisdale, W. H., G. H. Dungan, and C. E. Leighty. **Flag smut of wheat.** U. S. Dept. Agric. Dept. Circ. 273. *6 p., 2 pl.* 1923.—Discovery, prevalence, symptoms and control are given and resistant varieties listed.—*L. R. Hesler.*

4521. Walker, J. C. **Disease resistance to onion smudge.** Jour. Agric. Res. 24: 1019–1040. *4 pl., 4 fig.* 1923.—Through general observation and actual testing of numerous varieties it was determined that colored bulb varieties of onion as a class are resistant while white varieties are susceptible to smudge, a bulb decay caused by *Colletotrichum circinans* (Berk.) Vog. Under optimum conditions for development the outer uncolored sheath tissue at the neck of colored bulbs is often attacked, but seldom do the outer colored scales become even slightly affected. If the dry, outer, colored scales are removed and the organism applied to the colored fleshy scale, penetration and normal invasion occur. The resistant principle is therefore active only in the dry outer scales. Young seedlings of colored and white varieties are equally susceptible to attack.—Two groups of substances very toxic to the fungus were found in onion bulbs. One of these was contained in the volatile oil which is given off readily from onion tissue especially after crushing. Spores exposed to this oil were immediately killed and growth of hyphae was retarded. Since there was no apparent difference between colored and white tissue in the amount of oil produced, the conspicuous varietal resistance already noted can not be attributed to this factor. The possible influence of such a toxin in the host tissue upon the degree of parasitism of the invader is suggested.—The other group is associated with scale pigmentation. Cold water extracts from dry outer colored scales are very toxic to spores and hyphae. According to the concentration of the toxin, the reaction ranges from complete inhibition of germination to slight retardation of growth. At certain concentrations germination starts, but the tip of the germ tube ruptures. Similar extracts from outer scales of white varieties and from uncolored portions of otherwise colored scales (i.e., neck-sheath tissue) support good germination and growth. It is postulated that these toxins which are closely associated or identical with pigment, diffuse from the dead tissue into soil or meteoric water and deactivate the fungus before infection can take place. In the case of colored fleshy scales there is no exosmosis of the toxins. The fungus penetrates the cuticle, dissolves the cell wall, and destroys the pigment in advance.—There is no correlation between host cell-sap acidity or acidity of the cold water extracts of colored outer scales and resistance. —*Author.*

4522. Weimer, J. L. **Two diseases of udo (Aralia cordata Thunb.).** Jour. Agric. Res. 26: 271–278. *4 pl.* 1923.—Two diseases of udo, one a root-rot caused by a fungus very similar to if not identical with *Sclerotinia libertiana* Fckl. and the other a wilt due to *Verticillium alboatrum* R. & B., are described. Both occurred in udo plantings near Washington, D. C The causal fungi were isolated and their pathogenicity proved. The wilt, which was typical of the disease produced in other plants by *V. alboatrum,* developed in udo planted on soil which had previously grown wilted eggplants (*Solanum Melongena* Linn.). Although the Sclerotinia

failed to produce apothecia and hence could not be definitely determined, it appeared to be in every way like *Sclerotinia libertiana.*—*Author.*

4523. Welch, D. S. **A sclerotial disease of cultivated Delphinium.** [Abstract.] Phytopathology **14**: 31. 1924.

4524. White, R. P. **Tomato wilt.** [Abstract.] Phytopathology **14**: 28. 1924.

4525. Winston, John R., and John J. Bowman. **Commercial control of citrus melanose.** U. S. Dept. Agric. Dept. Circ. 259. *8 p.* 1923.—This is a brief discussion of citrus melanose (*Phomopsis Citri* Fawcett), with suggestions for control. A tentative spray schedule is given. Bordeaux mixture (3–3–50) is advised. Pruning dead wood to control melanose in a normal mature grove is not likely to give paying results.—*L. R. Hesler.*

4526. Winston, John R., Harry R. Fulton, and John J. Bowman. **Commercial control of citrus stem-end rot.** U. S. Dept. Agric. Dept. Circ. 293. *10 p.* 1923.—This is a discussion of control of citrus stem-end rot caused either by *Phomopsis Citri* or *Diplodia natalensis.* It is advised that dead wood be removed and young fruit sprayed once or twice with 3–3–50 Bordeaux mixture plus 1% oil as emulsion before May 5 (under ordinary Florida conditions), as may be required for good melanose control. Fruit should be kept at low temperatures (40–45°F.).—*L. R. Hesler.*

4527. Wolf, Frederick A. **Strawberry leaf-scorch.** [Abstract.] Phytopathology **14**: 30. 1924.

4528. Young, W. J. **An investigation of clover root rot [Fusaria.]** [Abstract.] Phytopathology **14**: 63. 1924.

DISEASES CAUSED BY BACTERIA

4529. Anonymous. **Walnut blight. Introduction of immune variety by the Department.** New Zealand Jour. Agric. 27: 25. 1923.—*Pseudomonas Juglandis* is so common that further plantings should be limited to *Juglans Hindsii*, which is immune.—*N. J. Giddings.*

4530. Burkholder, Walter H. **Varietal susceptibility among beans to the bacterial blight.** Phytopathology **14**: 1–7. 1924.—A large number of varieties and various strains of commercial varieties of beans were tested for resistance to infection by *Phytomonas Phaseoli* (E. F. S.) Committee S. A. B. The beans were planted in 10-foot rows in the field and when the plants were barely past the seedling stage they were sprayed with a water suspension of the bacteria. While none of the varieties was immune, they showed various degrees of resistance. Crosses between some of the more resistant varieties are being made with the hope of increasing resistance.—*B. B. Higgins.*

4531. Clayton, E. E. **A progress report on black-rot investigations, with special reference to cauliflower on Long Island.** [Abstract.] Phytopathology **14**: 24. 1924.—A summary of results with methods of controlling the disease (*Bacterium campestre*) is given.—*B. B. Higgins.*

4532. Elliott, Charlotte, and Erwin F. Smith. **A bacterial disease of broomcorn and sorghum.** [Abstract.] Phytopathology **14**: 48. 1924.—*Bacterium Andropogoni* E. F. S. is the causal organism.—*B. B. Higgins.*

4533. Fawcett, H. S., W. T. Horne, and A. F. Camp. **Citrus blast and black pit.** California Agric. Exp. Sta. Tech. Paper 5. *36 p., 6 pl.* 1923.—Citrus blast, which affects the leaves and shoots of citrus trees, and black pit, a disease of the fruit, are shown to be caused by the same organism, *Pseudomonas citriputeale* C. O. Smith. Blast develops most rapidly during periods of cool damp weather, and is characterized by brown or black areas, usually starting from a break or tear in the wing of the petiole. Black pit is found almost exclusively on lemons causing sunken black spots in the fruit. Inoculation with the citrus-blast organism on the leaves of live oak (*Quercus Wislezenii*) produced characteristic lesions; but attempts to produce the disease on cherry, apricot, pear and almond all failed. Observation and experiment show that infection almost always starts at a spot where some mechanical injury has taken place, and develops most rapidly in cool rainy weather. Spraying with Bordeaux mixture about Nov. 1 is effective. The authors also recommend all possible precaution against mechanical injury during windstorms.—*Margaret Buwens.*

4534. Gloyer, W. O. **The effect of late planting on the bacterial blight of beans.** [Abstract.] Phytopathology **14**: 27. 1924.

4535. Hedges, Florence. **Bean wilt (Bacterium flaccumfaciens Hedges). Further studies.** [Abstract.] Phytopathology **14**: 27. 1924.

4536. Hedges, Florence. **Soy bean pustule. Comparative studies with Bacterium Phaseoli sojense Hedges and Bacterium Phaseoli E. F. S.** [Abstract.] Phytopathology **14**: 27–28. 1924.

4537. Johnson, James. **Experiments with dusting and spraying for the control of tobacco wildfire in seed-beds.** [Abstract.] Phytopathology **14**: 50. 1924.

4538. Johnson, James, and H. F. Murwin. **Disinfection of tobacco seed against wildfire.** [Abstract.] Phytopathology **14**: 50–51. 1924.

4539. Leach, Julian G., and R. C. Rose. **Experiments with inoculated sulphur for scab control.** [Abstract.] Phytopathology **14**: 57. 1924.

4540. Levine, Michael. **Studies on plant cancers. VI. Further studies on the behavior of crown gall on the rubber plant, Ficus elastica.** Mycologia **16**: 24–29. *Pl. 6*. 1924.—Older stems of the rubber plant may develop galls but they do not kill the stem, although they weaken it. When terminal parts of the plant are inoculated with *Bacterium tumefaciens*, galls develop and the death of the terminal portions finally acts like a decapitation and the dormant buds below develop. The effect seems to be mechanical rather than pathological. Sometimes negative geotropic responses appear in branches which develop near inoculated points.—*G. R. Bisby.*

4541. McCulloch, Lucia. **Two bacterial diseases of gladiolus.** [Abstract.] Phytopathology **14**: 63–64. 1924.—An undescribed leaf blight is caused by *Bacterium gummisudans* n. sp., and a leafbase and bulb rot is caused by *Bacterium marginatum* L. McC.—*B. B. Higgins.*

4542. Martin, Wm. H. **Experiments with sulfur for the control of potato scab, summary of 1921 results.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 582–595. 1921/22 [1924].—In 4 field tests comparing inoculated and uninoculated sulphur applied at the rate of 600 pounds per acre, the former showed an increase of 42.2% and the latter 25.9% in the number of clean tubers. In tests to determine the influence of the amount of inoculum on the oxidation of sulphur, the addition of 1% to sulphur flour gave as good results as 2 and 4%. Where sulphur was applied in combination with potato fertilizer the control of scab was not so good as where the material was broadcasted; in addition there was considerable injury to the potato crop following this method of application.—*Author.*

4543. Martin, Wm. H. **The influence of the source of nitrogen on the prevalence of potato scab.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 596–599. 1921/22 [1924].—Eighty-one per cent of the crop was unsalable on the plots receiving all nitrate of soda as a source of nitrogen in a complete fertilizer as compared with 68.8% where sulphate of ammonia was used. In a 2nd test 20% of the crop was free from scab on the nitrate of soda plots and 42% on the plots treated with sulphate of ammonia.—*Author.*

4544. Meier, F. C., and G. K. K. Link. **Potato brown-rot.** U. S. Dept. Agric. Dept. Circ. 281. *6 p., 2 pl.* 1923.—The disease (*Bacterium Solanacearum*), is described and control measures are given.—*L. R. Hesler.*

4545. Poole, R. F. **Investigation of the horse-radish root rot.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 560–561. 1921/22 [1924].—This trouble, due to a bacterium, is a serious disease in storage pits. Losses from root rot were reduced where the roots were rolled in flowers of sulphur before pitting. Clean seed can be obtained by cutting the ends of all roots and dipping them in 1:1000 solution of bichloride of mercury for 15 minutes.—*Wm. H. Martin.*

4546. Riker, A. J. **Relations of temperature and moisture to the development of crown-gall.** [Abstract.] Phytopathology **14**: 30. 1924.

4547. Riker, A. J. **Some relations of the crowngall organism to its host tissue.** Jour. Agric. Res. **25**: 119–132. *5 pl.* 1923.—A detailed study of the mode of infection by the crown-gall organism (*Bact. tumefaciens* Smith and Town.) isolated from raspberry, and of its location in the host tissue was made upon tomato stems. It was found that the infection took place only through wounds which might remain infection courts for several days. When needle punctures were made into the stems liquid was found to flood the intercellular spaces about the wounds. This liquid exerted a positive chemotactic influence on the bacteria, which produced galls that, in the early stages, coincided in outline with the flooded regions. The bacteria

which were found in larger numbers than has previously been supposed, were observed between the cells in free-hand sections and also in microtome preparations when dilute stains were employed. Under certain conditions the organisms were found to migrate through the vascular system. A final check on the position of the bacteria was made by microscopic observations of their growth in free-hand sections embedded in agar.—*Author.*

4548. Sanford, G. B. **Some factors influencing the development of potato scab.** [Abstract.] Phytopathology **14:** 58–59. 1924.

4549. Valleau, W. D., and Charles Hubbard. **Angular leaf-spot and wildfire infection of tobacco plant beds by spitting.** [Abstract.] Phytopathology **14:** 51. 1924.

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

4550. Aubertot, Maurice. **Présence du Leptomonas davidi Lafont chez une Euphorbe d'Alsace.** [Presence of Leptomonas davidi Lafont in an Alsatian Euphorbia.] Compt. Rend. Soc. Biol. 89: 1111–1113. 1923.—This flagellate is reported in the latex of *Euphorbia cyparrisias.—Oran Raber.*

4551. Brown, Nellie A. **An apple stem tumor not crown gall.** [Abstract.] Phytopathology **14:** 29–30. 1923.—The tumors were apparently due to woolly aphis.—*B. B. Higgins.*

4552. Franchini, [G.] **Sur les protozoaires des plantes.** [Protozoans of plants.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland **1923:** 191–195. 1923.—This is a review of progress. The author has observed protozoans in lactiferous plants representing 9 families, and also in plants without latex (cabbage). Infested plants may or may not appear diseased. Healthy plants have been infected with the aid of latex from parasitized plants. Some organisms present in plant latex are similar in appearance to those found in insects and in vertebrates. Plants have been infected with protozoans from insects and from man (Kala-azar); several protozoan parasites of animals and man are culturable on plant latex. Kittens and mice have been infected with parasites from plant latex. Several genera of insects may be able to transmit protozoan parasites to plants through punctures or by depositing infected feces near wounds. It seems justifiable to assume that plants may sometimes serve as "reservoirs for the virus of protozoan diseases" of man and animals.—Some virus diseases of plants may be of protozoan etiology; conclusive demonstration is lacking. The author found no parasites of any sort in stems or leaves of leaf-roll potato plants. Protozoans in general are not as resistant to heat, cold, and chemicals as the virus of mosaic of plants, but certain stages are very small and very resistant. The causal agents of such plant diseases evidently differ in morphology from the protozoans of animals, but it is known that the form of these organisms varies according to the medium in which they develop.—*Philip Brierley.*

4553. Godfrey, G. H. **Present status of stem and bulb nematode in America.** [Abstract.] Phytopathology **14:** 62. 1924.

4554. Godfrey, G. H. **The eelworm disease; a menace to alfalfa in America.** U. S. Dept. Agric. Dept. Circ. 297. *8 p., 4 fig.* 1923.—Alfalfa stem nematode (*Tylenchus dipsaci*) and the disease which it produces are described. Control methods are given.—*L. R. Hesler.*

4555. Holmes, Francis O. **A flagellate infection of milkweeds in Maryland.** [Abstract.] Phytopathology **14:** 54. 1924.—A small flagellate (*Leptomonas Elmassiani* Migone) was found infesting the latex of *Asclepias syriaca* near Baltimore, Maryland.—*B. B. Higgins.*

4556. Jarvis, Edmund. **Combating insect pests. Bureau of Sugar Experiment Stations. Summary of paradichlor experiments at Meringa.** Australian Sugar Jour. **15:** 467–470. *2 fig.* 1923.—Experimental plots at Meringa consisted of a strip of land 605 feet long containing rows of first ratoon of D. 1135. Ten rows were untreated and 8 rows were injected with paradichlor in January. The dry fumigant was inserted on both sides of cane rows 12–18 inches apart, 6 inches deep and 4 inches from stools. Three months after application the treated cane was 7–8 feet high and the treated areas were sharply bounded by the yellowing, grub-infested check plots.—*C. Rumbold.*

4557. Lefroy, H. Maxwell. **Manual of entomology with special reference to economic entomology.** *xvi + 541 p., 4 pl., 179 fig.* Edward Arnold & Co.: London, 1923.—"In lecturing one's attempt is to pick out what the student can know—essentials, and not details, are the requisite—and this volume attempts to select the usual ordinary facts about each group, which

the student requires. I have tried to adhere to a sequence of subject ideas: name, popular name, diagnosis, geographical distribution, appearance and recognition in the field, external structures, sex recognition, internal structure, life history, habitat, food, literature, authorities, economic importance."—Host reactions are caused by some of the insects discussed.—*Frederick V. Rand.*

4558. Slogteren, E. van. **Address to the members of the international conference of phytopathology and economic entomology June 28, 1923.** *24 p., 1 + 15 fig.* Lisse, Holland, 1923.—For several years the author has studied nematode diseases with special reference to bulb culture in Holland and discusses the subject from the following points of view: "(1) The transition of the nematodes from one crop to another, with which the question of the biological strains and the possible danger of the transportation of plants is closely connected. (2) The movements of the nematodes in the soil, which is of great importance for the combating of these parasites. (3) The combating of the nematodes in the stocks, first in the fields, and later in the dry bulbs after that they are lifted out of the soil. This will show you how necessary it is for the phytopathologist to study all the factors which govern the life of the plants."—*Frederick V. Rand.*

4559. Slogteren, E. van. **Modern methods of combating bulb diseases.** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland 1923: 150–162. *Pl. 11, fig. 1–3.* 1923.—The subject matter, dealing entirely with eelworm diseases, is divided into 3 parts: (1) biological strains, (2) movements of nematodes in the soil, and (3) combating the disease in bulb stocks.—(1) Inoculations of small areas of ground, well isolated from one another by mortar cylinders, with distinct narcissus and hyacinth strains of *Tylenchus dipsaci* followed by planting these bulbs in various combinations gave results that appeared to justify the conclusion that these 2 strains of the nematodes were quite distinct. The introduction of large numbers of daffodil nematodes into the center of a hyacinth by means of a syringe resulted, after planting, in a much deformed growth, but the following year the hyacinth was quite healthy again. The conclusion is drawn that transition from one host to the other does not take place very readily. —(2) Nematodes from diseased bulbs buried as deep as 125 cm. in sand moved upward to the surface and infected bulbs that were planted there. That this was not due alone to movement of gravitational water in the soil was shown by a further experiment in which the organisms traveled to a height of 70 cm. above ground level in tubes filled with sand. Observations showed that the nematodes soon die in soil when there is not sufficient food for them, provided the soil is constantly moist as it is in Holland.—(3) Control consists of a combination of roguing out diseased plants during the growing season, and a hot water treatment of the cured bulbs. The roguing consists in removing the diseased plants and the soil for a foot or so around them as well, thus removing such nematodes as are in both plants and soil. Bulbs are not planted again in this ground for a few years. The hot water treatment is applied to the entire planting stock of any lot of bulbs that has shown even a slight amount of the disease in the field. It consists of immersion for 2½–4 hours according to the size of the bulbs in water maintained at 43½°C. by means of a thermo-regulator. The same treatment kills the larvae of the large and small narcissus flies, *Merodon equestris* and *Eumerus strigatus*. The effect of the treatment upon the subsequent growth and flowering of the bulbs depends upon the time that has elapsed since the bulbs were lifted, and upon the length of time they are held in favorable storage conditions before planting. An injury to the young roots apparently results from the heat treatment, but this is overcome by storage for some time under proper conditions, and an actual improvement in growth over that from the untreated bulbs seems to result.—*G. H. Godfrey.*

4560. Thomas, Edward E. **The citrus nematode, Tylenchulus semipenetrans.** California Agric. Exp. Sta. Tech. Paper 2. *34 p., 8 pl.* 1923.—The citrus nematode is found in all of the principal citrus districts of California, but is most prevalent in the older sections. It attacks the small feeding rootlets where the greatest injury is apparent; a symptom is the separation of the bark of the rootlet from the woody portion. Both observation in the field and the results of an experiment under carefully controlled conditions show that citrus trees are definitely injured as the result of infestation by this parasite. Badly infested trees appear undernourished, the leaves are small and often mottled and the fruits are small. The parasites are spread through the use of infected nursery stock and may be scattered from one grove

to another in various ways. The organism can live in the soil a considerable time (perhaps 2 years) after the infested trees have been removed. No practical method of control was found. Various chemicals were applied to the soil around the tree, but even though some of the treatments were so severe that the trees were injured none controlled the nematodes. In the treatment of nursery trees best results were obtained with hot water, but the temperature necessary to kill the nematodes and eggs was close to the danger point for the trees. The author therefore concludes that when this organism once becomes established on citrus trees, there appears to be no satisfactory way of removing it.—*Margaret Buvens.*

4561. Thorne, Gerald. **Length of the dormancy period of the sugar-beet nematode in Utah.** U. S. Dept. Agric. Dept. Circ. 262. *5 p.* 1923.—*Heterodera schachtii* Schmidt, in dormant form (cyst), is able to remain in the soil several years even when deprived of its host plants. A greater percentage of the eggs have hatched at the end of 6 years, which closely marks the limit of the dormancy period. There is no possibility of eradicating the sugar-beet nematode from the soil by any method of crop rotation applicable to general farm practice.—*L. R. Hesler.*

4562. Yoder, P. A., and J. W. Ingram. **Hot-water treatment of sugar cane for insect pests.—A precaution.** U. S. Dept. Agric. Dept. Circ. 303. *4 p.* 1923.—Attention is called to the danger of injuring cane by hot-water treatment, 30 minutes at 50°C. (suggested by E. W. Brandes), if it has sprouted during winter storage. It seems unsafe to use this treatment if the eyes have developed a sprout. If such cane is subjected to the hot-water treatment it may be necessary to plant much thicker in order to secure a normal stand.—*L. R. Hesler.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

4563. Blodgett, F. M. **Time-temperature curves for killing potato tubers by heat treatments.** Phytopathology 13: 465–475. *3 fig.* 1923.—Potato tubers of the Rural type affected with leaf-roll and Bliss potatoes affected with mosaic were subjected to hot water treatments over a range of temperatures from 35 to 80°C. At each temperature used treatments were made over a range of time from short intervals up to those long enough to kill the potatoes, to determine the time-temperature curve for the killing of potatoes, the virus of mosiac, and the virus of leaf-roll. In all cases the potatoes remained diseased as long as they remained alive. The time-temperature curve for the practically complete killing of the potatoes may be represented by the equation $\log_{10} t + 0.09552\ X = 6.5896$ in which t is time in minutes and X is temperature in °C. Black heart resulted at all temperatures between 40 and 100°C. in the neighborhood of the time range necessary for killing potatoes. Hot air treatments were tried with white sprout potatoes affected with mosaic. All potatoes surviving the treatment developed mosaic. The time temperature curve for killing potatoes in a well ventilated hot air oven may be represented by the following equation: $(t - 8.4255)\ (X - 34.5)^3 = 1057500$.—*F. M. Blodgett.*

4564. Brandes, E. W., and Peter J. Klaphaak. **Cultivated and wild hosts of sugar-cane or grass mosaic.** Jour. Agric. Res. 24: 247–262. *4 pl.* 1923.—Due to the possible perpetuation of mosaic of such cultivated grasses as sugar cane, corn, sorghum and millet by survival of the disease in wild grasses nearby, the susceptibility of many wild forms was tested experimentally. Of 40 grasses, both wild and cultivated, which were tested, 13 species were found to be susceptible: *Saccharum officinarum, Zea mays, Holcus Sorghum, Pennisetum glaucum, Miscanthus sinensis, Saccharum narenga* (S. P. I. No. 38332), *Paspalum boscianum, Syntherisma sanguinalis, Chaetochloa lutescens, C. magna, Echinochloa crusgalli, Panicum dichotomiflorum, Brachiaria platyphylla.*—A suggestion of a higher degree of specialization than is found in other diseases of this type lies in the observation that all species found susceptible are in the 3 tribes Paniceae, Andropogoneae, and Tripsaceae which are grouped at the upper end of the 13 tribes of the grass family. Virus mixed with various bactericidal chemicals 1 hour before injection into healthy plants failed, with 1 exception, to cause infection. Infection also failed when the virus injected was diluted with distilled water. In 1 experiment virus passed through a rather corase Berkfeld filter caused infection in 3 out of 4 plants inoculated.—The edible bamboo, *Phyllostachys pubescens,* exhibits typical symptoms of grass mosaic, but that it is an infectious mosaic has not been experimentally demon-

strated as in the case of the other 13 species. In the insect transmission experiments, "virulent" and "nonvirulent," insects were obtained respectively from mosiac and healthy cane or sorghum. Only *Aphis maidis* acted as a vector of the grass mosaic.—An interesting method for saving labor in handling aphids in inoculation experiments is described.—Several varieties of sugar cane of the slender type similar to Uba, formerly regarded as immune, were demonstrated to be susceptible to mosaic, but Uba itself gave no evidence of susceptibility.—Injury to corn as measured by diminished yield is demonstrated in large field experiments to be very great.—Experiments on transmission of grass mosaic by seeds of corn, sorghum, and wild grasses all gave negative results.—*E. W. Brandes.*

4565. Carsner, Eubanks, and C. F. Stahl. **The relation of Chenopodium murale to curly-top of the sugar beet.** [Abstract.] Phytopathology **14**: 57. 1924.

4566. Doolittle, S. P., and M. N. Walker. **Experiments on the control of cucurbit mosiac.** [Abstract.] Phytopathology **14**: 56. 1924.

4567. Elmer, Otto H. **Mosaic cross-inoculation studies.** [Abstract.] Phytopathology **14**: 55. 1924.

4568. Foëx, Etienne. **Quelques causes de dégénérescence chez la pomme de terre. [Some causes of degeneration in potatoes.]** Compt. Rend. Acad. Agric. France **1920**: 398–407. 1920.—The author gives a brief description of leaf-roll and of mosaic and compares them as to points of similarity and difference. Leaf curl has been found in France but the author has not yet seen mosaic there. For control he advocates the establishment of pure, disease-free stocks for seed purposes. In discussing the paper, Emile Schribaux mentions the influence of climatic factors on potato stocks and describes the favorable results obtained from tubers preserved at low temperatures (2–4°C.).—*E. A. Bessey.*

4569. Kunkel, L. O. **Insect transmission of aster yellows.** [Abstract.] Phytopathology **14**: 54. 1924.—The disease is transmitted by the leaf-hopper *Cicadula sex-notata* Fall.—*B. B. Higgins.*

4570. McClintock, J. A. **Peach rosette, an infectious mosaic.** Jour. Agric. Res. **24**: 307–316. *10 pl.* 1923.—The results presented in this paper confirm the work of E. F. Smith to the effect that rosette is readily transmitted from peach to peach by buds from infected trees, and that the Marianna plum is very resistant to this disease. Rosette was transmitted from peach to apricot, cultivated plum, wild plum, Mazzard cherry, and almond. From all of these hosts rosette was transmitted back to peach except in the case of cherry. Mottling of the leaves typical of mosaic occurred in some hosts.—In no case was rosette transmitted by means of sap from an infected host, or by insects which had fed on an infected host.—Tests up to date of publication indicated that rosette is not soil transmitted.—*Author.*

4571. Poole, R. F. **Celery mosaic.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 567. *1 pl.* 1921/22 [1924].—This is essentially a summary of a paper already abstracted [see Bot. Absts. 12, Entry 688].—*Wm. H. Martin.*

4572. Rankin, W. H. **Running-out of raspberries.** New York Agric. Exp. Sta. Circ. 67. *12 p.* 1923.—The running-out of raspberries is attributed to 3 infectious diseases, namely, mosaic, leaf curl, and rosette. The susceptibility of different varieties is noted and recommendations for controlling the diseases are presented.—*Richard Wellington.*

4573. Rawlins, T. E., and James Johnson. **Cytological studies on tobacco mosaic.** [Abstract.] Phytopathology **14**: 55–56. 1924.

4574. Brehmer, von. **Die anatomischen und mikrochemischen Veränderungen des Kartoffelleptoms. [Anatomical and microchemical changes in the leptome of the potato.]** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland 1923: 79–85. *Pl. 5–6.* 1923.—The writer distinguishes between necrobiosis, necrosis and obliteration. Necroboisis and obliteration are found in normal or diseased plants and characterize old age, while necrosis is found only in plants suffering from leafroll. Necrobiosis affects first the protophloem, especially the cells next to the phloem fibers. The affected cells begin to swell while their lumen gradually disappears. The swollen cell substance consists of cellulose, water and mucilage. Necrobiosis is found wherever phloem is extensively developed; it is seldom observed in the tuber itself. Necrosis may originate in necrobiotic as well as healthy tissues. If it originates in necrobiotic tissue the walls appear swollen besides being chemically

changed. When necrosis affects normal tissue, there is very little swelling of the walls. The necrotic cell walls have a peculiar fissured appearance and are colored yellow as the disease progresses. With phloroglucin and HCl the necrotic areas are colored red; the writer however does not believe that lignification of the phloem has taken place. True obliteration of the phloem is never observed in growing plants but becomes evident when leaves and stems begin to die previous to the harvesting of the tubers.—*Ernst Artschwager.*

4575. WALKER, M. N. **Physalis and cucurbit mosaic intertransmissible.** [Abstract.] Phytopathology **14**: 56. 1924.

4576. WALKER, M. N. **The mosaic disease of Nicotiana glutinosum not distinct from tobacco mosaic.** [Abstract.] Phytopathology **14**: 57. 1924.

4577. WILCOX, RAYMOND B., AND FLOYD F. SMITH. **Transfer of mosaic disease from red to black raspberries.** [Abstract.] Phytopathology **14**: 55. 1924.

NON PARASITIC DISEASES

4578. WATERS, R. **Apple-flesh collapse or brown-heart. Control measures for orchard and cool store.** New Zealand Jour. Agric. **27**: 32–41. 1923.—A study of measures for control of this disease has shown that (1) locality is a minor factor under New Zealand conditions; (2) weather, cultivation, fertilization, and age of trees are not of great importance in their effect upon flesh collapse; (3) maturity is an extremely important factor; (4) method of packing, and time elapsing between picking and storing must be given consideration; (5) temperature range and ventilations are vital factors in storage. The humidity is also believed to be worthy of consideration. The more mature fruits show greatest amount of flesh collapse. Suggestions are given for improvement in present practices.—*N. J. Giddings.*

4579. WELLENSIEK, S. J. **Ontijdige knolvorming bij vroege aardappels. [Untimely tuber formation in early potatoes.]** Mededeel. Landbouwhoogeschool Wageningen **27**[3]: 1–24. *4 pl.* 1923.—Untimely tuber formation was considerable and harmful in Holland during the period 1915–1917, and in 1922. Temperature of the soil alone does not cause this malformation. Seed potatoes kept at 9–13°C. formed long shoots, while tubers kept at 1.5–5°C. were normal. The trouble occurs also after years in whcih potato plants have suffered from drought at the end of the vegetative period, which causes a too early ripening and shoot formation. Methods of control are low water table in fields during the beginning of the vegetative period, which causes a rich development of the root system; and a higher water table toward the end of the vegetative period. Keeping seed potatoes at low temperatures and in the light and avoiding too early sprouting are advised.—*J. C. Th. Uphof.*

4580. YOUNG, H. C., AND R. C. WALTON. **Spray injury.** [Abstract.] Phytopathology **14**: 61. 1924.

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

4581. BEACH, W. S. **Some new methods and results in the control of lettuce diseases with formaldehyde.** [Abstract.] Phytopathology **14**: 28–29. 1924.

4582. BISBY, G. R. **Potato seed treatment tests in Manitoba.** [Abstract.] Phytopathology **14**: 58. 1924.

4583. CLAYTON, E. E. **Control of black-rot and black-leg of cruciferous crops by seed and seed bed treatments.** [Abstract.] Phytopathology **14**: 24–25. 1924.—Hot water, 50°C. for 25 and 33 minutes, gave best control of both black-rot (*Bacterium campestre*) and black-leg (*Phoma lingam*).—*B. B. Higgins.*

4584. COOK, MEL. T. **Root diseases of sugar cane in Porto Rico.** [Abstract.] Phytopathology **14**: 59. 1924.

4585. COOK, MEL. T., AND WM. H. MARTIN. **Diseases of tomatoes.** New Jersey Agric. Exp. Sta. Circ. 104. *15 p., 6 fig.* 1918.—Circulars 71 and 97 of the New Jersey Agric. Exp. Sta. are combined in this publication.—*Wm. H. Martin.*

4586. FLETCHER, T. BAINBRIGGE. **Note on plant imports into India.** Agric. Res. Inst., Pusa Bull. 115. *1052–1069. 3 pl.* 1921.—Recent quarantine regulations are given. Numerous insect pests and diseases have been found on plant shipments coming into India. Methods of fumigation are also discussed.—*N. J. Giddings.*

4587. Hartley, Carl, and R. D. Rands. **Plant pathology in the Dutch East Indies.** Phytopathology **14**: 8–23. *3 fig.* 1924.—The paper includes a discussion of the relation of the planters' associations to this pioneer work in tropical plant pathology, the more important diseases investigated, the agencies at present fostering the work, and the facilities available for plant pathological work in the islands. A list of the serial publications relating to botanical subjects is appended.—*B. B. Higgins.*

4588. Hauduroy, P. **I. Recherches du bactériophage de D'Hérelle. Présence du principe dans l'eau de mer.** [**I. Researches on the bacteriophage of D'Herelle. Presence of the principle in sea water.**] Bull. Inst. Oceanogr. Monaco 433. *12 p.* 1923.—This is an invisible filterable virus which disintegrates bacteria. It is possible to find in seawater a bacteriophage which is active against certain microbes pathogenic to man, but this is rare.—*T. C. Frye.*

4589. Hauduroy, P. **Recherches du bactériophage de D'Hérelle dans de l'eau de mer conservée seize ans au laboratoire (II• note).** [**Investigations on the bacteriophage of D'Hérelle in seawater kept 16 years in the laboratory (2nd note.)**] Bull. Inst. Oceanogr. Monaco 434. *2 p.* 1923.—The results were negative.—*T. C. Frye.*

4590. Henry, A. W., and H. C. Gilbert. **Minnesota sunflower diseases in 1923.** [Abstract.] Phytopathology **14**: 64. 1924.

4591. Jehle, R. A., F. W. Oldenburg, and C. E. Temple. **Relation of internal cob discoloration to yield in corn.** [Abstract.] Phytopathology **14**: 46. 1924.

4592. Jones, Carleton Parker. **Determination of sulphur compounds in dry lime-sulphur.** Jour. Agric. Res. **25**: 323–336. *2 fig.* 1923.—The 3 principal forms of sulphur,—monosulphide, thiosulphate, and residual sulphur, contained in dry lime-sulphur are easily determined by simple evolution methods: (a) Decomposition of the polysulphide and the removal of H_2S by the passage of CO_2 through the solution; (b) decomposition of the polysulphide in solution by the addition of dilute HCl (the amount previously determined by simple titration), using methyl orange as indicator, and the removal of H_2S by nitrogen gas. The procedure then followed is alike in both cases. The monosulphide sulphur is absorbed and oxidized by a solution of hydrated Na_2O_2 and finally determined as $BaSO_4$. The thiosulphate sulphur is separated from the precipitated sulphur by filtration and determined by the use of standard I_2. The residual sulphur, consisting of the polysulphide sulphur minus the monosulphide plus any free sulphur is determined by weight.—*Author.*

4593. Kempton, F. E. **Progress in barberry eradication.** [Abstract.] Phytopathology **14**: 40–41. 1924.

4594. Kolle, W., and H. Hetsch. **Die experimentelle Bakteriologie und die Infektionskrankheiten, mit besonderer Berücksichtigung der Immunitätslehre.** [**Experimental bacteriology and the infectious diseases, with especial reference to immunology.**] 2 vol. *6th ed., 1376 p., 114 pl. (many col.), 214 fig.* Urban & Schwarzenberg: Berlin, 1922.—This large medical work takes up the construction and operation of the microscope, morphology and general biology of pathogenic microöganisms, disinfection, general facts concerning infection, infective agents and their specificity, mixed and secondary infections, immunity and protective inoculation and serum treatment, antibodies, and anaphylaxis.—Following this general discussion specific pathogenes are taken up, and include in each case such phases as history, description of the causal organism, pathology, diagnosis, epidemiology, prophylaxis, immunity and immunization, and literature references. In this way are discussed specific diseases of man and animals caused by bacteria, fungi, protozoa, and filterable viruses and other communicable diseases the causes of which are still problematical.—*Frederick V. Rand.*

4595. Leach, Julian G. **Spraying vs. dusting for potatoes.** [Abstract.] Phytopathology **14**: 57–58. 1924.

4596. Martin, Wm. H. **Potato spraying and dusting tests in 1921.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 574–582. 1921/22 [1924].—Coöperative spraying and dusting tests were conducted with the commercial and late crop. Spraying with home-made Bordeaux mixture (5–5–50) gave much more efficient control of early blight and tip burn than did dusting with a copper-lime dust. In 1 test with home-made Bordeaux mixture the average yield of the check plots was 148.3 bushels as compared with 201.9 and 229.5 bushels for the plots receiving 3 and 4 applications respectively.—*Author.*

4597. MARTIN, WM. H. **Ten years of potato spraying in New Jersey.** New Jersey Agric. Exp. Sta. Bull. 383. *32 p.* 1923.—Spraying tests with the Irish Cobbler variety conducted over a period of 10 years show an average increase in yield of 28.2 bushels per acre as the result of spraying with Bordeaux mixture. In the tests conducted since 1919 an average increase of 42.6 bushels resulted. These results were obtained in the absence of late blight. Spraying tests with the American Giant variety, in the absence of late blight, have not resulted in increased yields. In 1 test where this disease was a factor, however, an increase of 69.4 bushels per acre was secured. Spraying experiments with late crop Irish Cobblers gave an average increase amounting to 33.2 bushels per acre. Copper-lime dusts proved inferior to Bordeaux mixture. Home-made Bordeaux mixture gave better control of early blight, tip burn and late blight than did commercial Bordeaux mixture.—*Author.*

4598. POOLE, R. F. **Studies of sweet potato diseases.** Ann. Rept. New Jersey Agric. Exp. Sta. **43:** 554–560. 1921/22 [1924].—Results of investigations on the following diseases are given: (1) *Soil rot* or *ground rot.* Broadcasting sulphur considerably reduced severity of infection. Fertilizer carrying 5–6% nitrogen is recommended where the trouble is severe. The keeping quality of potatoes from sulphured plots was superior to that from non-sulphured plots.—(2) *Scurf.* The experiments conducted indicate that broadcasting 200–400 pounds of sulphur about 1 month previous to setting the crop greatly reduces losses from this disease. —(3) *Stem rot.* The Yellow Jersey variety has proved very susceptible to this disease while the Big Stem Jersey is the most resistant.—The relation of hot-bed management to the development of stem rot is discussed.—*Wm. H. Martin.*

4599. POOLE, R. F. **Tomato spraying and dusting experiments at Riverton.** Ann. Rept. New Jersey Agric. Exp. Sta. **43:** 561–565. 1921/22 [1924].—In a spray test with Bonny Best tomatoes—a second-early variety—4 applications of 4–4–50 Bordeaux mixture gave increased returns amounting to 1863 pounds per acre. On the sprayed plots 41% of the leaves were infected with *Septoria Lycopersici* as compared with 93.8% on unsprayed checks. On the Greater Baltimore—a late variety—5 applications of 4–4–50 Bordeaux mixture gave an increase of 1275 pounds per acre as compared with 1888 pounds for a copper-lime dust, 1325 pounds for a copper-soap mixture, and 2038 pounds for a Bordeaux-soap mixture. With 7 applications the increase in yield was not marked, but there was a decided improvement in the quality of the fruit.—*Wm. H. Martin.*

4600. REDDY, CHAS. S., AND J. R. HOLBERT. **Experiments to show the effects of certain seed treatments on corn.** [Abstract.] Phytopathology **14:** 44–45. 1924.

4601. RUMBOLD, CAROLINE. **Sugar beet seed disinfection with formaldehyde vapor and steam.** [Abstract.] Phytopathology **14:** 66. 1924.

4602. SHERBAKOFF, C. D. **Three little known diseases of strawberries.** [Abstract.] Phytopathology **14:** 60–61. 1924.

4603. THOMPSON, NOEL F. **Kill the common barberry with chemicals.** U. S. Dept. Agric. Dept. Circ. 268. *4 p., 3 fig.* 1923.—It is recommended as a result of experimental work that common salt or sodium-arsenite be used.—*L. R. Hesler.*

4604. TISDALE, W. H., AND R. W. LEUKEL. **Water and lime-water baths following the formaldehyde seed treatment.** [Abstract.] Phytopathology **14:** 43. 1924.

4605. TISDALE, W. H., J. W. TAYLOR, AND R. W. LEUKEL. **Further studies on new seed disinfectants.** [Abstract.] Phytopathology **14:** 43–44. 1924.

4606. WEBER, G. F. **Potato diseases and insects.** Florida Agric. Exp. Sta. Bull. 169. *103–163. 55 fig.* 1923.—Descriptions are given of the most important potato diseases in Florida. Late blight (*Phytophthora infestans* (Mont.) De By.) is the oldest (1903) and most serious disease in Florida. Copper-lime dust containing 6% metallic copper applied in 6 fields resulted in increased yield, averaging 25% over undusted check plots. Dust proved cheaper than Bordeaux paste when the control was approximately the same. Home-made Bordeaux mixture and copper-lime dust gave about the same control, but the latter cost over $10 an acre more than the former.—Bacterial wilt (*Bacterium Solanacearum E.F.S.*) causes considerable reduction in the stand which has been directly attributed to the rotting of the seed pieces. The principal control method is to plant disease-free seed.—Blackleg (*Bacillus phytophthorus* Appel) is scattered well over the potato sections of Florida. Best

control is secured by planting certified disease-free seed.—Early blight (*Macrosporium Solani* F. & M.) appears on the leaves as soon as it warms up—usually in March—when the plants are two-thirds grown. The field should be sprayed several times with 5–5–50 Bordeaux mixture. All dead vines should be destroyed and during the early summer weeds along fences and roads should be cut.—Black scurf (*Corticium vagum* B. & C.) is very common in Florida. The fungus persists for indefinite periods in the soil, attacking many cultivated plants. It is often associated with potato growing on low, poorly drained soil. Planting disease-free tubers, treating seed with corrosive sublimate, and rotating crops are advised.—Southern wilt (*Sclerotium Rolfsii* Sacc.) is common, appearing upon plants in all stages of growth, especially during rainy seasons. No definite control measures are known. Removing diseased plants from the field should be practised strenuously and frequent cultivation tends to check the disease.—Mosaic is state wide. The Spaulding Rose No. 4, grown almost exclusively around Hastings, is more or less free. Curl leaf and leaf curl are very common.—Fusarium wilt (*Fusarium oxysporum*, Schl.) is not evident until blossoming time or soon afterward. Planting certified disease-free seed and rotating crops are advised.—Common scab (*Actinomyces scabies* (Thaxter) Güssow) is not common. The seed should be treated with corrosive sublimate.—Silver scurf (*Spondylocladium atrovirens* Harz) has rarely been found.—Spindle sprout occurs among the poorer grades of seed.—Yellow dwarf was found near Elkton.—Wart (*Synchytrium endobioticum* (Schilb.) Per.) and powdery scab (*Spongospora subterranea* (Wallr.) Johns.) have not been found in Florida.—*J. C. Th. Uphof.*

4607. White, R. P. **Loss of strength of mercuric chloride solutions used for treating potatoes.** [Abstract.] Phytopathology **14**: 58. 1924.

4608. Wylie, Robert B. **Wound healing of mesophytic leaves.** [Abstract.] Phytopathology **14**: 53–54. 1924.

4609. Young, H. C. **Colloidal sulphur as a spray material.** [Abstract.] Phytopathology **14**: 61–62. 1924.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. Youngken, *Editor*

E. N. Gathercoal, *Assistant Editor*

(See also in this issue Entries 4088, 4109, 4121, 4164, 4168, 4203, 4254, 4317, 4347)

4610. Anonymous. **Plants in relation to the health of man.** Nature **112**: 376. 1923.—This is excerpted from a Chadwick public lecture by A. W. Hill at the Chelsea Physic Garden on June 13 and refers to the use of *Ficus, Cinnamomum, Erythroxylon, Melinis, Ocimum, Acacia,* and *Cinchona.*—*O. A. Stevens.*

4611. Anonymous. **The composition and examination of volatile oils.** [Rev. of: Gildemeister, E., and F. Hoffmann. **The volatile oils.** 2nd ed. translated by Edward Kremers. Vol. 3. *xx* + *777 p.* Longmans, Green and Co.: London, 1922.] Nature **112**: 581–582. 1923.

4612. Annett, H. E., Hari Das Sen, and Har Daval Singh. **A survey of the Indian poppy-growing districts for morphine content of the opium produced.** Agric. Res. Inst. Pusa Bull. 116. *9 p.* 1921.—Collections from various provinces, covering a period of 3 years show considerable variation in the morphine content for different provinces. The majority of the poppies grown in India produce opium of good medicinal standard, provided the product of the 1st lancing is kept separate for that purpose.—*N. J. Giddings.*

4613. Charlton, J. **The determination of prussic acid in Burma beans, Phaseolus lunatus.** Agric. Res. Inst. Pusa Bull. 140. *7 p.* 1922.—HCN occurs in *Phaseolus lunatus* in varying amounts and increases with age, after harvesting. Addition of malt to new beans in the steeping operation of extraction increased the amount of HCN liberated.—*N. J. Giddings.*

4614. Douni, R. [Rev. of Moll, J. W., and H. H. Janssonius. **Botanical pen portraits.** *vii* + *472 p.* Martinus Nijhoff: The Hague, 1923 (see Bot. Absts. 12, Entry 6607).] Rev. Gen. Bot. **23**: 480. 1923.

4615. Dowell, C. T., and Paul Menaul. **Effect of autoclaving upon the toxicity of cottonseed meal.** Jour. Agric. Res. **26**: 9–10. 1923.—The authors compare the physiological action

of commercial and autoclaved cottonseed meal on adult sheep and young pigs and show that by subjecting cottonseed meal to the effects of autoclaving and subsequent air drying, its poison is destroyed, also that different lots of cottonseed meal contain varying amounts of the poison.—*C. T. Dowell.*

4616. Fricke, K. und O. Lüning. **Über den chemischen Nachweis von Maismehl in Back- und Teigwaren.** [**Chemical demonstration of cornmeal in baker's goods and pastries.**] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **45**: 69–78. 1923.

4617. Greger, Justin. **Beiträge zur Kenntnis der Samen und Früchte von Ackerunkräutern. III. Zur Kenntnis einiger Papaver-Samen.** [**Seeds and fruits of field weeds. Some poppy seeds.**] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **45**: 156–157. 1923.—The author describes the characteristics of the seeds of *Papaver dubium*, *P. Argemone*, and *P. Rhoeas* and compares them with those of *P. somniferum*. The diagnostic characteristics are to be found in the seed coats.—*E. E. Stanford.*

4618. Griebel, C. **Über derzeitige Misstände im Gewürzhandel.** [**Present day abuses in the spice-trade.**] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **45**: 52–60. 1923.—Although the grossly adulterated war-time spices have disappeared from trade, many sophistications still occur. War-time white pepper composed largely of ivory-nut powder and synthetic piperidine has nearly disappeared. Cinnamon ground from refuse bark is common and can usually be recognized by low aldehyde content, lack of flavor, grittiness, and high acid-insoluble ash. Paprika is adulterated with corn meal and artificially colored with animal dyes or with tumeric. The latter may be microscopically identified by the swollen starch masses. A method for confirming its identity by the boric-acid reaction is given. Animal dyes are usually shown by wool-dying processes, which are discussed. Paprika is often moldy or infested with mites. Cardamoms are often ground with large percentages of pericarp.—*E. E. Stanford.*

4619. Heiduschka, A., und P. Zywnev. **Über orientalische Zuckerwaren. (Türkischer Honig.)** [**Oriental sugar-products (Turkish honey).**] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **45**: 61–64. 1923.—Various sugar products are known as "Halwa" in Turkey, Bulgaria, and neighboring countries. The chief kinds are white halwa and tachyn halwa. The basis of both is a thick sugar-foam formed through action of saponin on syrup. White halwa contains nut meats, and tachyn halwa sesame meal. Methods of preparation and analyses are given.—*E. E. Stanford.*

4620. Marsh, C. D., and A. B. Clawson. **Woolly-pod milkweed: A dangerous stock-poisoning plant.** U. S. Dept. Agric. Dept. Circ. 272. *3 p., 1 fig.* 1923.—The woolly-pod milkweed (*Asclepias eriocarpa*) is described and figured, and symptoms of poisoning are described. While effective remedies are unknown, the authors present suggestions.—*L. R. Hesler.*

4621. Marsh, C. Dwight, A. B. Clawson, and James F. Couch. **Greasewood as a poisonous plant.** U. S. Dept. Agric. Dept. Circ. 279. *4 p., 2 fig.* 1923.—Greasewood, or "chico" (*Sarcobatus vermiculatus*) grows abundantly in parts of western U. S. A. Under most conditions it is good forage, but under exceptional conditions it may be very destructive to sheep. The poisoning is due to its sodium and potassium oxalates. Practical features are presented.—*L. R. Hesler.*

4622. Marsh, C. Dwight, G. C. Roe, and A. B. Clawson. **Livestock poisoning by cocklebur.** U. S. Dept. Agric. Dept. Circ. 283. *4 p., 2 fig.* 1923.—Experimental work on poisoning of livestock by cocklebur (*Xanthium echinatum*) is reported. Remedies are suggested.—*L. R. Hesler.*

4623. Menaul, Paul. **The physiological effect of gossypol.** Jour. Agric. Res. **26**: 233–237. 1923.—Gossypol administered to rabbits in the diet manifests its toxic action slowly, but when introduced into the blood stream its toxic action is apparent at once. Its most serious effect is on the blood. By determining the amount of oxygen that can be liberated from a sample of blood before and after the addition of small quantities of gossypol, it is clear that in some manner the gossypol inhibits the liberation of free oxygen from oxyhemoglobin. Gossypol also exerts a hemolytic effect on erythrocytes. Gossypol causes death in animals by reducing the oxygen-carrying capacity of the blood. Thus an excessive burden is thrown on the respira-

tory and circulatory organs, which results in the condition found in animals dead from cottonseed poisoning, namely, a passive hyperemia and oedema of the lungs and some hydrothorax. These conditions are always present and are not due to bacterial infection. A tabulated blood and urine analysis shows that a cottonseed-meal diet has a diuretic action. At first, the concentration of the non-protein nitrogen and sugar of the blood is increased, but after the 2nd month they are lowered far below the normal.—*Author.*

4624. Rhode, H. **Der Nicotingehalt von Kraut und Rauch einheimischen unbehandelten Tabaks.** [Nicotine content of leaf and smoke of domestic unprocessed tobacco.] Zeitschr. Untersuch. Nahrungs- u Genussmittel **45**: 112–115. 1923.

4625. Schofield, Frank W. **Damaged sweet clover; the cause of a new disease in cattle simulating hemorrhagic septicaemia and blackleg.** Jour. Amer. Vet. Med. Assoc. **64**: 553–575. 1924.—This a detailed account of a new disease to which cattle are especially susceptible, which is caused by eating spoiled sweet clover silage. An extended description of the symptoms and morbid anatomy is given. The author's experiments show that the disease is caused by the product of the action of certain strains of moulds on Melilotus silage.—*C. D. Marsh.*

4626. Smith, F. B., and C. T. White. **The peach leaf poison bush, Trema aspera Blume: Its occasional toxicity.** Proc. Roy. Soc. Queensland **32**: 132-134. 1920..—The suspected poisonous properties of the plant are reviewed. By chemical tests, at various times, it is found that the leaves are occasionally cyanophoric, showing that the plant is then capable of producing death in stock.—*W. D. Francis.*

4627. Thurston, Azor. **Pharmaceutical and food analysis: a manual of standard methods for the analysis of oils, fats and waxes, and substances in which they exist together with allied products.** *8vo, xiii+416 p.* Chapman and Hall, Ltd.: London, 1923.

4628. Weinhagen, Albert B. **Beiträge zur Muscarin-Frage. II. Über Pseudo-Muscarin ("synthetisches Muscarin").]** [Contribution to the muscarin question. II. Pseudo muscarin (synthetic muscarin).] Zeitschr. Physiol. Chem. **112**: 13–37. 1920.—Cholin chloroplatinate was treated with HNO_3 to produce synthetic muscarine, and the reaction studied for its by-products. Several of these were isolated and identified. Slight differences in treatment produce different by-products along with the synthetic muscarine, and some of these are not merely neutral with reference to heart action, but may be antagonistic to the muscarine itself. The results are believed to account for the great variations reported as to minimal doses of the drug.—*Chas. A. Shull.*

PHYSIOLOGY

B. M. Duggar, *Editor*

W. J. Robbins, *Assistant Editor*

(See also in this issue Entries 4099, 4136, 4137, 4140, 4154, 4242, 4319, 4324, 4427, 4464, 4474, 4488, 4491, 4508, 4521, 4546, 4563, 4613)

GENERAL

4629. Beijerinck, M. W. **Verzamelde Geschriften.** [Collected writings.] Vol. 1–5. Martinus Nijhoff: The Hague, 1921.—This collection includes in chronological order the extensive contributions of the author in the field of biology, largely in that of microbiology with a notable number of papers dealing with physiological problems.—*B. M. Duggar.*

4630. Kolkwitz, R. **Pflanzenforschung** I. Heft. **Phanerogamen.** [Plant investigation. Vol. 1. Phanerogams.] *64 p., pl. 1, 37 fig.* Gustav Fischer: Jena, 1922.—This may be considered a supplement to the author's plant physiology. It contains a discussion of essential elements and nutrient salts; chlorophyll and its function; diffusion, osmosis, and turgor; sugar, starch, cellulose, and fat; protein; water and air; respiration; growth, movement and irritability; reproduction and inheritance.—*W. J. Robbins.*

DIFFUSION, PERMEABILITY, PHYSICO-CHEMICAL PHENOMENA

4631. Breazeale, J. F. **The absorption of carbon by the roots of plants.** Jour. Agric. Res. 26: 303–311. 1923 [1924].—Wheat seedlings, when grown in solutions containing either carbonates or nitrates, usually yield an ash containing carbonates. When carbonates are in the culture solution, the plants seem to absorb the CO_3 ion by means of their roots; when nitrates ($NaNO_3$ for example) exist in the solution, the plants seem first to absorb the NO_3 ion, which, in the case of $NaNO_3$, leaves some of the base, Na, in solution. This base then combines with the CO_2 in the solution, and forms Na_2CO_3 or $NaHCO_3$. The plants then absorb the CO_3 radicle. Plants probably absorb CO_3 as an ion, or exude CO_2 from their roots, whenever necessary, in order to maintain equilibrium in their tissues. Plants do not seem to be able to absorb CO_2 when dissolved in water, without the presence of a soluble base, but the absorption of a basic radicle, K for example, seems to be dependent upon the absorption of an acid radicle. Experiments are reported indicating that the C of CO_3 absorbed by roots can not to any appreciable extent replace the C of CO_2 absorbed by leaves. The author questions the term "lime loving" as applied to plants,—it might be more probably "carbonate loving."—*Author.*

4632. Hoagland, D. R., and A. R. Davis. **Further experiments on the absorption of ions by plants, including observations on the effects of light.** Jour. Gen. Physiol. 6: 47–62. 1923.—*Nitella clavata* was used in studying the removal of certain ions from dilute solutions. The fact that light influenced the removal of certain ions by *Nitella* caused the authors to conclude that the absorption of ions from dilute solutions involves energy exchange, with light as the ultimate source of the energy. One ion may affect the penetration into the sap of another ion even in solutions of low concentration. It is thought probable that all 3 types of relationships may exist—anion to anion, cation to cation, and anion to cation.—*O. L. Inman.*

4633. Lecomte du Noüy, P. **Les phénomènes de tension superficielle en biologie.** [**Surface tension in biology.**] Compt. Rend. Soc. Biol. 89: 1076–1077. 1923.—Attention is called to the fact that in measuring the surface tension of colloidal solutions, in which class most biological fluids are, it is necessary to take into account the time factor. The surface tension generally decreases with time and no surface tension measurements are of value unless the time is recorded.—*Oran Raber.*

4634. Lepeschkin, W. W. **Permeabilitätsänderungen des Protoplasmas nach der Methode der isotonischen Koeffizienten.** [**Changes in permeability determined by isotonic coefficients.**] Biochem. Zeitschr. 142: 291–307. 1923.—The use of isotonic coefficients to measure permeability changes is defended against objections raised by Fitting. It is maintained that changes in permeability of 3–20% can be detected, but that the absolute permeability can be measured only approximately.—*H. D. Hooker, Jr.*

4635. McGuigan, H., and G. A. Brough. **Rhythmic banding of precipitates (Liesegang's rings).** Jour. Biol. Chem. 58: 415–423. 1923.—A theory of rhythmic precipitation is advanced which accounts for the action of the gel. This theory accepts the descriptions of the process given by Bradford and by Holmes, which are essentially alike. Precipitation in gels does not differ from precipitation in water; therefore, adsorption is no more important in gels, where precipitation is banded, than in water, where it is continuous. The function of the gel is to fix the precipitate where it is formed, and to restrict the zone of the influence of the ions, by reducing to a minimum the factors which make for turbulence or diffusion. It is pointed out that any influence that lessens the turbulence of the reaction makes for rhythmic precipitation.—*G. B. Rigg.*

4636. Ulehla, Vladimir, und Vladimir Morávek. **Ueber die Wirkung von Säuren und Salzen auf Basidiobolus ranarum Eid.** [**Effect of acids and salts on Basidiobolus ranarum.**] Ber. Deutsch. Bot. Ges. 40: 8–20. *Fig. 1–6.* 1922.—The authors consider the behavior of terminal hyphal cells in various concentrations (1 N-0.00001N) of HCl and other acids, and of mixtures of acids and salts. Bursting occurred in concentrations varying from 0.4N to 0.00005N HCl but not at 0.00001N, the limit being at about $2 \times 10^{-5}N$. The results with other acids were similar. The authors regard the acid concentration ($2 \times 10^{-5}N$) where bursting ceases as the isoelectric point of the cell membrane. Using mixtures of salts and acids it was found that with higher concentrations of salts the effect of acids was commonly suppressed while

with lower concentrations of salts the effect of acids was increased. The plasmolytic action of salts was reduced by the addition of acids. The conclusion is drawn that bursting of the hyphae is a physico-chemical process depending mainly on the H-ion concentration and the behavior of the cell membrane.—*W. E. Maneval.*

WATER RELATIONS

4637. Greaves, J. E., and E. G. Carter. **The influence of irrigation water on the composition of grains and the relationship to nutrition.** Jour. Biol. Chem. **58:** 531–541. 1923.—With increase in the amount of irrigation water used, the percentage of N in wheat, oats, and barley (dry weight basis) decreased as follows: wheat 21%, oats 40%, barley 19%. Everything else determined in the analysis increased progressively as the amount of water used in irrigation was increased, the increase in per cent being as follows: ash: wheat 46, oats 31, barley 36; P: wheat 55, oats 35, barley 30; K: wheat 35, oats 31, barley 14; Ca: wheat 155, oats 22, barley 41; Mg: wheat 32, oats 65, barley 9. The ratios of Ca and Mg to P indicate that the increase in P is mainly inorganic. These results point strongly to the fallacy of over irrigation from the standpoint of soil fertility, for it depletes the soil in 2 ways: (1) it washes out the soluble N, which is a limiting factor in soil fertility in the arid region, and thus produces a low protein grain; and (2) it causes the grains to take up larger quantities of K and P than they otherwise would, thus unnecessarily depleting the soil.—*G. B. Rigg.*

4638. Shive, J. W. **The relation of soil moisture to physiological salt balance for plants.** Soil Sci. **14:** 391–411. *6 fig.* 1922.—Buckwheat plants were grown in soil containing 30, 60, and 80% of the maximum water-retaining capacity of the soil. KH_2PO_4, $Ca(NO_3)_2$, and $MgSO_4$ in 21 different combinations were added to the soil. The salt proportions producing the high yields were not materially altered by variations in the degrees of soil-moisture when the total osmotic concentration values of the solutions added were approximately constant. Pronounced shifting of the proportions of the salts producing high yields occurred only with marked variations in the total concentration of the solutions. The retarding influence of unfavorable soil-moisture conditions upon the rate of growth of plants cannot be counteracted by fertilizer treatment alone. The salts of a fertilizer mixture can not be efficiently utilized by the plants under unfavorable moisture conditions.—*W. J. Robbins.*

4639. Teodoresco, E. C. **L'athermanéite des essences végétales et la transpiration. [Volatilization of vegetable essences and transpiration.]** Rev. Gén. Bot. **35:** 382–398, 455–461, 509–519, 566–575. 1923.—The observations made in these experiments permitted the formation of the following general conclusions concerning the role of the essential oils in nature: the vegetable essences provoke a diminution of transpiration; this diminution is due to the action of the essences on the vitality of the protoplasm, by preventing a lowering of the permeability of the protoplasmic membrane; the volatilization of essential oils plays no appreciable role in the transpiration of plants.—*J. C. Gilman.*

MINERAL NUTRIENTS AND SALT RELATIONS

4640. Allison, R. V. **Effect of aeration and continuous renewal of nutrient solutions upon the growth of barley and buckwheat in artificial culture.** Ann. Rept. New Jersey Agric. Exp. Sta. **43:** 402–407. *2 pl.* 1921–22 [1924].—With buckwheat grown in Shive's 3-salt solution best yields and greatest leaf areas were produced by aerated drip cultures, next best by cultures which were aerated only, and poorest yields by simple solution and drip culture solutions. Similar results were obtained with barley.—*Wm. H. Martin.*

4641. Comber, N. M. **The availability of mineral plant food. A modification of the present hypothesis.** Jour. Agric. Sci. **12:** 363–369. 1922.—The author's summary gives the essential facts of his paper, as follows: "The assumption that plants feed in the soil just as they feed in water culture solution is unjustified and contrary to the facts. In modification of the usual hypothesis two possibilities are discussed. 1. The absorption of colloids by the plant. 2. The union of the root hairs with the soil and other mineral particles (so that the plant and the soil form one system) and the dissolution of the particles by the organic matter of the root hair so attached."—*R. P. Marsh.*

4642. Frouin, Albert. **Le fer et le zinc n'ont aucune influence sur le développement de l'Aspergillus niger en présence de glucose.** [Iron and zinc have no effect on the growth of A. niger in the presence of glucose.] Compt. Rend. Soc. Biol. 89: 986–988. 1923.—To a nutrient solution containing distilled water, KH_2PO_4, $MgSO_4$, and NH_4NO_3 were added respectively tartaric acid, glucose, iron sulphate, and zinc sulphate. Under such circumstances when sufficient glucose is present the absence of Zn does not diminish the growth, and the absence of Fe appreciably increases it. The results previously announced by Raulin must hence be modified.—*Oran Raber.*

4643. Hoagland, D. R., and J. C. Martin. **Effect of salts on the intake of inorganic elements and on the buffer system of the plant.** California Agric. Exp. Sta. Tech. Paper 8. *26 p.* 1923.—Barley plants were grown in culture solutions containing excess Na salts and the effect on the absorption of ions was noted. The presence of these salts caused a marked alteration in the composition of the plant tissue. When NaCl is used, Na and Cl may be absorbed and stored in relatively large quantities. When Na_2SO_4 is used, the Cl ion is removed more rapidly than the SO_4 ion. To determine the effect that the absorption of alkali salts would have on the chemical constants of the plant sap, barley, peas and pumpkins were grown in modified culture solutions, and determinations made of the freezing point depression, H-ion concentration, and the buffer effect. The authors discuss the question of alkali injury in general in the light of results found in these experiments. A bibliography is given.—*Margaret Buvens.*

4644. Lagatu, Henri. **L'absorption des principals fertilisants par la vigne aux différentes époques de sa végétation.** [Absorption of the principal fertilizers by the grape vine at different stages of its growth.] Ann. École Nation. Agric. Montepellier 17: 251–269. [1919?]—At the beginning of the growing season the rate of absorption of Ca, K, and Mg is nearly equal. Then Ca is absorbed at a higher rate than K and Mg and retains its lead for the remainder of the season. K shows 2 periods of absorption: the 1st begins May 1 and lasts until July 1; the 2nd begins about Aug. 1 and lasts to the end of the season. Mg is absorbed at an approximately constant rate throughout the season. This is true also of N, only its rate is very high. Phosphoric acid is absorbed at a fairly high rate until July 1, and very slowly during the remainder of the season.—*F. F. Halma.*

4645. McHargue, J. S. **Common earthenware jars a source of error in pot experiments.** Jour. Agric. Res. 26: 231–232. *1 pl.* 1923.—When sand cultures containing plant nutrients were placed in common earthenware jars, and water added, some of the nutrients migrated through the walls of the pots and were deposited on the outside. Other pots with no deposits of mineral nurients gave results which showed that the plants growing in them were obtaining nutrients which must have been absorbed in the porous walls of the pots. Plants grown in new pots made of well glazed acid-proof stoneware showed a very marked diminution of growth as compared to those grown in the common earthenware jars. The author concludes that for careful work only pots made of acid-proof stoneware should be used.—*Author.*

4646. McHargue, J. S. **Effect of different concentrations of manganese sulfate on the growth of plants in acid and neutral soils and the necessity of manganese as a plant nutrient.** Jour. Agric. Res. 24: 781–794. *2 pl.* 1923.—Plants grown in acid soil were injured by the addition of $MnSO_4$. This injury was eliminated when $CaCO_3$ was added to the soil. Plants grown in purified quartz sand in pots made of acid-proof stoneware and supplied with Mn-free $CaCO_3$, KH_2PO_4, $Ca(NO_3)_2$, $MgSO_4$, KCl, and $Fe(OH)_2$, show less green weight and dry weight than similar plants supplied with Mn salts. The plants grown in the absence of Mn also show chlorosis. It is concluded that Mn is an essential element for the normal growth and development of plants. The amount required is small and unless special precautions are taken may be furnished in the minerals or the substrate used. It is also suggested that soluble Mn may be one of the causes of toxicity in acid soils.—*W. J. Robbins.*

4647. Marsh, Robert P. **Comparison of iron from some organic compounds as an essential constituent of nutrient media for plants.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 399–402. 1921/22 [1924].—Tests with soluble ferric phosphate, ferric glycero phosphate, and ferric tartrate indicate that with each of these compounds the highest yields of both tops and roots are obtained in solutions containing 1–2 mgm. of Fe per l. The 3 compounds appeared to be about equally efficient in maintaining health and vigor in plants.—*Wm. H. Martin.*

4648. Prince, Arthur L., Linus H. Jones, and John W. Shive. **Notes on differential ion absorption by plants in relation to reaction changes in nutrient solutions.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 378–383. *2 fig.* 1921/22 [1924].—Results of studies are presented seeking to determine whether any correlation exists between change in pH values of nutrient solutions in contact with plant roots and absorption of certain ions by plants. It was found that the rates of absorption of different ions and the rates of reaction change varied with the age of plants. In the 3-salt nutrient solution used the reaction change toward the neutral point is believed to be directly related to and primarily caused by the high rate of NO_3 absorption as against the low rate at which Ca is taken up. In a similar experiment, in a solution with $(NH_4)_2SO_4$ replacing $Ca(NO_3)_2$, an increase in H-ion concentration occurred chiefly as the result of differential absorption of NH_4 and SO_4 ions. In solutions in which plants were able to obtain nitrogen from either NO_3 or NH_4 the plants drew heavily on the NH_4 ions during the early growth stages and less heavily upon the NO_3 ions; in later stages this condition was reversed resulting in an increase in the H-ion concentration in the former stage with a sudden reversal in the direction of the change at the later stage of their development.—*Wm. H. Martin.*

4649. Reed, H. S., and A. R. C. Haas. **Effect of sodium chlorid and calcium chlorid upon growth and composition of young orange trees.** California Agric. Exp. Sta. Tech. Paper 4. *32 p., 6 pl.* 1923.—Orange trees were grown for 16 months in sand cultures under controlled conditions. One lot received a culture solution lacking Ca; the 2nd the same with the addition of 1000 parts per million NaCl; and the 3rd the same as the 2nd, but with $CaCl_2$ added. At about the beginning of the 2nd cycle of growth the trees began to show the effect of Ca deficiency. Most of the leaves fell, and the new ones were frequently chlorotic. The trunk began to die and the root system was poorly developed. The trees receiving Ca made much better growth. At the end of the growth period, analyses of leaves, shoots, trunk, root and rootlets showed that increasing the amount of NaCl in the culture solution increased the absorption of both Na and Cl ions. When Ca was lacking from the culture solution, all tree parts contained very small amounts of Ca, the trunk and root more nearly the normal amount. Trees receiving a surplus of NaCl plus the full amount of Ca contained less Ca in the ash than those grown in full nutrient solution. The authors conclude that this difference is due to the greater concentration, and consequent greater absorption, of other ions. Absorption of both Mg and K was greater in the absence of Ca.—*Margaret Buvens.*

4650. Reed, H. S., and A. R. C. Haas. **Studies on the effects of sodium, potassium and calcium on young orange trees.** California Agric. Exp. Sta. Tech. Paper 11. *32 p., 5 pl.* 1923.—Trees grown in solutions lacking Ca but in which Na was increased made very poor growth. The leaves fell, new leaves were curled and mottled, the trunk began to die at the top, and the root system was stunted. When Ca was supplied the trees did not show this injury, but the total growth was subnormal. This ability of trees to grow with large amounts of Na salts in the solution, provided Ca is present in sufficient amounts, is considered significant. Trees grown in the absence of K made fairly good growth, through the chlorophyll had a tendency to fade out, producing a bronze-yellow coloration of the leaves; there was no abscission. Leaves of these trees analyzed significantly high in Ca. Trunk and roots of all the trees contained higher percentages of Na than other parts of the tree, and the rootlets were richer in PO_4, SO_4, and Cl ions.—*Margaret Buvens.*

4651. Shive, John W. **Effect of aeration and continuous solution renewal on the salt requirements for soybeans in water cultures.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 374–377. *1 fig.* 1921/22 [1924].—Plants were grown in a complete series of type I, 3-salt nutrient solution, provisions being made for constant renewal and aeration of the solution. Quantitative determinations showed the dissolved oxygen content of these solutions to vary only slightly while that of non-aerated solutions was rapidly depleted by the plants. Root development was superior in the aerated cultures. Larger volumes of nutrient media or constant aeration and continuous renewal of the solutions do not alter materially the relative proportions of salts required by the plants for good growth in the respective series.—*Wm. H. Martin.*

4652. Theron, J. J. **Influence of reaction on inter-relations between the plant and its culture medium.** Univ. California Publ. Agric. Sci. 4: 413–444. *12 fig.* 1924.—The general effect of excessive acidity was very characteristic and similar for alfalfa, cotton, cucumber,

Bermuda grass, corn, barley, and peas. If the culture solution is injuriously acid, the roots thicken and soon become dull white in color. Growth in length may be wholly or partially retarded. An injurious alkalinity of the culture solution produces a yellowish root discoloration; in extreme cases the roots become gelatinous and soon disintegrate. All plants grown on the acid side of pH 6.0 were deep green; above this reaction the color gradually became paler green, merging into complete chlorosis at higher pH values. The best growth was made when the reaction of the solution was between pH 5.0 and 6.0. The reaction of juice expressed from plant tops was not influenced by the reaction of the culture medium, but that of juices expressed from roots was considerably modified. The buffer effect of both roots and tops may be influenced by the reaction of the culture medium. In tops the acid reserve is affected; and in roots, the alkali reserve.—All plants employed changed the reaction of the complete culture solution toward some point between pH 6.5 and 6.9 regardless of the original reaction. The influence of the reaction was most marked on the rate of absorption of cations. Invariably there were more cations absorbed from alkaline than from acid solutions. This implies a relative increase of activity of cations in the solutions over that in the plant. The electric charge on the constituents of root cells may be assumed to be of vital importance in the mechanism of absorption. The nitrogenous constituents of the cell sap are charged negatively and the isoelectric points of the majority of the ampholytes in the cell are below pH 4.5. The fact that the optimum reaction for plant growth is on the acid side is possibly correlated in part with the greater ease with which the respiratory CO_2 can diffuse out and away from the roots at this reaction. If this theory be correct, the optimum reaction in soil will be slightly more toward the acid side, since the diffusion of CO_2 is retarded.—*H. S. Reed.*

PHOTOSYNTHESIS

4653. Gillis, J. **Zetmeelvorming bij Spirogyra onder den invloed van organische stoffen.** [Starch formation in Spirogyra under influence of organic substances.] Natuurwetenschapp. Tijdschr. 5: 118–121. 1923.—In the light and in the absence of CO_2 Spirogyra in solutions containing 1% of organic substances forms starch. In 1% glucose, maltose, and starch solutions, *Spirogyra porticalis* very rapidly produces starch; generally none is produced in darkness unless in the presence of glucose and maltose, which is contrary to Bokorny's results. Initially the plants must be entirely free from their own starch.—*J. C. Th. Uphof.*

4654. Reinhard, A. W. **Formation de l'amidon par les feuilles des plantes supérieures et présence de sucre dans les aliments.** [Formation of starch in leaves of higher plants with sugar present in the nutrient solution.] Compt. Rend. Soc. Biol. 89: 1274–1276. 1923.—Leaves of bean, white acacia, and pea produce starch in the absence of CO_2 if grown in nutrient solution containing sugar. The formation of starch is favored by light; yellow light is more efficient than blue.—*Oran Raber.*

METABOLISM (GENERAL)

4655. Anderson, R. J. **Concerning the anthocyans in Norton and Concord grapes. A contribution to the chemistry of grape pigments.** Jour. Biol. Chem. 57: 795–813. 1923.—The pigments occurring in Norton and Concord grapes have been isolated and purified and found to be identical in composition and properties. The coloring matter consists principally of a monoglucoside, anthocyanin, which is very similar to the oenin derived from *Vitis vinifera*, differing from the latter only in the color reaction with $FeCl_3$. The anthocyanin chloride corresponds to the formula $C_{23}H_{25}O_{12}Cl$. On hydrolysis with boiling HCl, it yields 1 molecule each of glucose and the sugar-free pigment, anthocyanidin chloride, $C_{17}H_{15}O_7Cl$. The spectrum of this substance consists of 1 broad band with indefinite margins extending from the yellow into the blue. The substance crystallizes in beautiful prisms. It is very similar to oenidin chloride, which is obtained on hydrolyzing oenidin; but it differs in that it contains a lower percentage of methoxy groups.—*G. B. Rigg.*

4656. Atkins, W. R. G. **The hydrogen ion concentration of some Indian soils and plant juices.** Agric. Res. Inst. Pusa Bull. 136. *12 p.* 1922.—Determinations were made upon wheat, oat, rice, cotton, mulberry, *Indigofera arrecta, Ricinus communis, Nicotiana tabacum,*

Cajanus indicus, Andropogon Sorghum, Saccharum officinarum, Carica papaya, Musa sapientum, and a berry-bearing tree. All gave acid reaction. The least acid were roots of wheat and oat. —*N. J. Giddings.*

4657. Belgrave, W. N. C. **Studies on Hevea latex: I. Coagulation.** Malayan Agric. Jour. 11: 348–370. 1923.—Temperature and volume changes on coagulation are investigated, and it is concluded that no change of state occurs on coagulation. Previous theories of coagulation are examined and evidence brought forward that the observations made can be differently interpreted. The conditions necessary for equilibrium and for separation of systems such as latex are considered. Experimental evidence is given that latex satisfies these conditions. The theory is put forward that coagulation is normally due to increase of H-ion concentration which may be brought about by bacterial action, and that the phenomena met with can be explained by the assumption of an isoelectric region for the protective protein. It is shown to be unlikely that the resins function as emulsifiers in normal latex. Certain difficulties are considered, and deductions of practical interest made in connection with the properties of coagulants and preservatives. The bearing of the theory on the Brown Bast problem is also considered.—*R. E. Holttum.*

4658. Belgrave, W. N. C., and R. O. Bishop. **Studies on Hevea latex: II. Some constituents of latex.** Malayan Agric. Jour. 11: 371–379. 1923.—An account is given of the separation of serum protein on neutralization; an alcohol-insoluble nitrogenous body from serum; constituents of a residue obtained by depolymerization by sunlight of an acid benzol solution of rubber; waxy bodies, phytosterols, resin acids, and a lecithin-like body from alcoholic liquors. Reasons are given for thinking that some of the proteins separated are either decomposition products or are different in composition from proteins normally met with. Unsuccessful attempts to estimate total nitrogen content of latex by Dumas' method are described.—*R. E. Holttum.*

4659. Cluzet, J., A. Rochaix, et Th. Kofman. **Variations de la concentration en ions hydrogène dans une culture microbienne.** [**Variations in H-ion concentration in a microbial culture.**]. Compt. Rend. Soc. Biol. 89: 1039–1040. 1923.—Using *B. coli, B. paratyphosus B* and others it is observed that the alkalinity increases rapidly (from pH 6.0 to 8.5) for 6 days and then remains fairly constant (e.g., pH 8.51 on 8th and 10th day), differing somewhat with the species of bacterium studied. [See also following entry.]—*Oran Raber.*

4660. Cluzet, J., A. Rochaix, et Th. Kofman. **Concentration limite en ions hydrogène, compatible avec le développement des cultures microbiennes.** [**The H-ion concentration limit compatible with the growth of bacterial cultures.**] Compt. Rend. Soc. Biol. 89: 1040–1041. 1923.—A culture medium too acid becomes more alkaline and one too alkaline becomes more acid as though each bacterium possessed the power of changing the medium to an H-ion concentration more favorable to its development. [See also previous entry.]—*Oran Raber.*

4661. Crozier, W. J. **Hydrogen ion concentration within the alimentary tract of insects.** Jour. Gen. Physiol. 6: 289–293. *Fig. 1.* 1924.—Larvae of *Psychoda* and of *Chironomus* (diptera) maintained in solutions of appropriate indicators show that the typical acidities (pH) prevailing within the several regions of the digestive tract are: esophagus, 7.1; cardiac chamber, 6.2; mesenteron, 7.5 (the latter being functionally an intestine). The acidity of the hindgut, pH 6.4, is due to the discharge of the Malphigian tubules.—*O. L. Inman.*

4662. Earl, John Campbell. **The chemistry of Posidonia fibre. Part I.** Jour. Chem. Soc. 123: 3223–3226. 1923.—This is a report of an investigation of the chemical composition of the fibrous remains of *Posidonia australis* which accumulate on the coasts of certain parts of Australia. The "cellulose" as determined by the customary Cross and Bevan method was found to be contaminated by a pentosan which was not removed from the fibers by treatment with aqueous alkalis and chlorine.—*F. E. Denny.*

4663. Farnell, R. G. W. **The pectic substance of sugar cane fibre.** Internat. Sugar Jour. 25: 630–636. 1923.—[An abridged report to the British Empire Sugar Res. Assoc., July 20, 1923.] An account is given of investigations comparing the penctinogen in cane fiber with the soluble pectin of the juice, and of a study of the precipitation of pectin during various methods of clarification which are used when making sugar.—*C. Rumbold.*

4664. Funk, C., B. Harrow, and Julia B. Paton. **Extraction of vitamins from yeast and rice polishings with various water-miscible solvents.** Jour. Biol. Chem. **57**: 153–162. 1923.

4665. Guillaume, M. A. **Sur les huiles retirées des graines de lupin.** [The oil extracted from lupine seed.] Compt. Rend. Soc. Biol. **89**: 887–889. 1923.—The amount of oil varies from 4 to 11% in the different species of *Lupinus*. Among the Leguminosae the lupines come 3rd in oil content, being surpassed only by peanut and soybean. The density, refractive index, saponification index, iodine index, acidity, and congealing point are given for the oils from 5 species.—*Oran Raber*

4666. Hara, S. **Über den Vitamingehalt verschiedene Speisepilze.** [The vitamin content of various edible fungi.] Biochem. Zeitschr. **142**: 79–100. *19 fig.* 1923.—Dried material of *Boletus edulis* Bulliard, *Craterellus cornucopioides* Linné, *Cantharellus cibarius* Fries, *Psalliota arvensis* Schaffer, *Clitocybe mellea* Vahl, *Hydnum repandum* Linné, and *Polyporus versicolor* was tested for vitamin content in the diet of mice, rats, guinea pigs, and pigeons. The presence of fat-soluble A was not determined. Water-soluble B was present in varying quantities, being present in large amounts in *Boletus edulis* and practically absent in *Clitocybe mellea*, *Hydnum repandum*, and *Craterellus cornucopioides*. No vitamin C was present in the dried material.—*H. D. Hooker, Jr.*

4667. Haworth, Walter Norman, and Wylam Birkett. **The constitution of the disaccharides. Part IX. Gentiobiose: Its identity with amygdalin biose.** Jour. Chem. Soc. **123**: 3120–3125. 1923.—Directions are given preparing gentiobiose, one of the rarest natural disaccharides, from the roots of *Gentiana lutea*. "Invertase hydrolyses the trisaccharide gentianose to gentiobiose and fructose, but some emulsin preparations effect the cleavage in another part of the molecule, yielding sucrose and glucose."—*F. E. Denny.*

4668. Haworth, Walter Norman, Edmund Langley Hirst, and David Arthur Ruell. **The constitution of raffinose.** Jour. Chem. Soc. **123**: 3125–3131. 1923.—Raffinose occurs in sugar beet molasses, in eucalyptus manna, in the leaves of *Taxus baccata*, and particularly in decorticated cotton-seed meal, which served as a source of the material for this investigation. When hydrolyzed with dilute acids or with invertase, raffinose yields melibiose and fructose; with stronger acids it yields galactose, glucose and fructose, but emulsin changes it into sucrose and galactose. The molecular linkings are shown in detail.—*F. E. Denny.*

4669. Hirst, Edmund Langley, and Donald Robertson Morrison. **The action of highly concentrated hydrochloric acid on cellulose and on some derivatives of glucose and of xylose.** Jour. Chem. Soc. **123**: 3226–3235. 1923.

4670. Jacobs, W. A. **Strophanthin. II. The oxidation of strophanthidin.** Jour. Biol. Chem. **57**: 553–567. 1923.

4671. Jacobs, W. A. **Strophanthin. III. Crystalline Kombe strophanthin. Preliminary note.** Jour. Biol. Chem. **57**: 569–572. 1923.—The formula $C_{23}H_{32}O_6$ is adopted for strophanthidin, and it is suggested that crystalline Kombe strophanthin possesses either the formula $C_{32}H_{48}O_{12}$ or $C_{31}H_{46}O_{11}$. In accordance with this the sugar is either $C_9H_{18}O_7$ or $C_8H_{16}O_6$. Up to the present, efforts to prepare the sugar in crystalline form have failed.—*G. B. Rigg.*

4672. Kadisch, E. **Das Hämotoxin des Fränkelschen Gasbrandbazillus.** [The hemotoxin of Fränkel's gas gangrene bacillus.] Biochem. Zeitschr. **142**: 29–35. 1923.—Larger amounts of hemolysin were produced in 2% glucose bouillon with chalk than in 5% Witte peptone bouillon made alkaline as for cholera. The hemolysin was made more permanent by drying. Dialysis and subsequent drying yielded an even more permanent dry preparation. Chalk did not have the property of increasing the formation of hemolysin. This is thought to be connected with carbohydrate metabolism.—*H. D. Hooker, Jr.*

4673. McCombie, Hamilton, and Harold Archibald Scarborough. **The chemical constitution of bacterial pigments. Part I. The isolation of pyocyanine and the preparation of its salts.** Jour. Chem. Soc. **123**: 3279–3285. 1923.—Pyocyanine is the characteristic blue pigment produced by *Bacillus pyocyaneus* when grown on certain media. Descriptions are given of the methods used in producing, extracting and identifying the pigment.—*F. E. Denny.*

4674. Macleod, J. J. R. **Insulin.** Physiol. Rev. **4**: 21–68. *7 fig.* 1924. [With bibliography.]

4675. Menaul, Paul. **A chemical analysis of Jatropha stimulosa.** Jour. Agric. Res. 26: 259–260. 1923.—The analysis of the seed of *Jatropha stimulosa* is as follows: hulls, 39%; kernel, 61%. The kernel yielded: water, 1.58%; ash, 3.50%; protein, 33.3%; fiber, 2.9%; N-free extract, 7.81%; fat, 50.91%. The characteristics of the oil and the N distribution of the protein are given.—*W. J. Robbins.*

4676. Menaul, Paul. **A method for the quantitative estimation of tannin in plant tissue.** Jour. Agric. Res. 26: 257–258. 1923.—The ground tissue is first extracted with petroleum ether and dried. The tannin is then extracted with 95% alcohol. The tannin in an aliquot of the alcoholic extract is precipitated with lead acetate, centrifuged and the supernatant liquid drained away. The tannin is redissolved with a few drops of dilute H_2SO_4, diluted, and centrifuged. To this supernatant liquid is added 2 cc. of a color reagent (100 gm. Na_2WO_4 + 30 gm. As_2O_5 + 50 cc. concentrated HCl per l.), then 10 cc. of 20% Na_2CO_3 solution. The mixture is diluted in a volumetric flask and the color compared with a known amount of tannin treated with the color reagent and alkali. The tannin content of grain sorghums varied from 0.5% to a trace.—*Author.*

4677. Onken, Albin. **Ueber die Bedeutung des Milch- und Schleimsaftes für die Beseitigung des überschüssigen Calziums, ein Beitrag zur Exkretphysiologie der höheren Pflanzen. [On the significance of latex and mucilaginous sap for the removal of surplus calcium.]** Bot. Archiv 2: 281–333. 1922.—The author investigated 138 latex-yielding plants of widely differing genera and families. The excess of Ca produced in these plants may be disposed of in one of the following possible ways: stored in the sap (true in numerous species), through oxalate or carbonate formation, by guttation, or by various combinations of these methods.—*William Seifriz.*

4678. Pech, J. L. **Sur l'extraction, de fruits oléagineux, d'un produit permettant l'émulsion dans l'eau de certaines huiles. [The extraction from oily fruits of a substance permitting emulsions of certain oils and water.]** Compt. Rend. Soc. Biol. 89: 983–984. 1923.—By an electrolytic method described a water-soluble substance of undetermined character is extracted from the pericarps of olives and almonds. Various oils form permanent emulsions with the water containing this extract, the emulsions lasting more than 2 years. The water extract prepared in this way loses its emulsifying property if an extract prepared in the same way but with the poles reversed is added to it. The substance comes only from the pericarps and the fruit must be chosen at just the proper time, neither when too ripe nor when insufficiently developed.—*Oran Raber.*

4679. Ruhland, W. **Aktivierung von Wasserstoff- und Kohlensäure Assimilation durch Bakterien. [Activating of hydrogen and carbonic acid assimilation by bacteria.]** Ber. Deutsch. Bot. Ges. 40: 180–184. 1922.—The results only, of experiments with H-oxidizing autotrophic bacteria are given. The ability to oxidize H_2 to obtain energy for assimilation of CO_2 is common among bacteria. As a result of oxidation of H_2,CO_2 is assimilated and O_2 evolved. Fe is necessary and cannot be replaced by any other heavy metal. Few of the forms studied could reduce KNO_3 and none could fix free N. The most favorable reaction was slightly alkaline. Methods and details are to be publsihed elsewhere.—*W. E. Maneval.*

4680. Sierakowski, Stanislaw. **Variations et nature des concentrations en ions H dans des cultures bactériennes. [Variation and nature of the H-ion concentration in bacterial cultures.]** Compt. Rend. Soc. Biol. 89: 1371–1373. 1923.—Both acid and alkaline media without sugar tend to become neutral or nearly so. The nearer the initial pH of the medium is to that finally attained the more rapid the development of the bacteria. The substance causing an increase of alkalinity is not yet known; the acidity is due to the production of CO_2.—*Oran Raber.*

4681. Weimer, J. L., and L. L. Harter. **Hydrogen-ion changes induced by species of Rhizopus and by Botrytis cinerea.** Jour. Agric. Res. 25: 155–164. 1923.—In a study of the influence of the growth of species of *Rhizopus* on the acidity of the substrate (Czapek's nutrient solution) it was found that all the species make the solution more acid except *R. nigricans* and *R. microsporus*. The expressed juice from sweet potatoes decayed by *R. Tritici* was more acid than that from potatoes decayed by *R. nigricans*. Raw sweet potato disks suspended in the juice of sweet potato decayed by *R. Tritici* were macerated in a shorter time than those

in the juice from potatoes decayed by *R. nigricans*. If, however, the H-ion concentration of the juices was made the same the disks were macerated in the same length of time. *R. Tritici* grown in Czapek's solution appeared practically unaffected by light as regards H-ion concentration of substrate, pectinase secretion, dry weight of fungus, fruiting, and amount of glucose consumed. *Botrytis cinerea* Pers. was found to increase the H-ion concentration of some substrates and decrease that of others. *B. cinerea*, although not normally a sweet potato storage-rot organism, produces a small amount of pectinase.—*L. L. Harter.*

4682. Wuth, O. **Serologische und biochemische Studien über das Hämolysin des Fränkelschen Gasbrandbazillus.** [Serological and biological studies on the hemolysin of Fränkel's gas gangrene bacillus.] Biochem. Zeitschr. 142: 19–28. 1923.—After a short period of growth Fränkel's bacillus formed hemolysin in suitable nutrient media. It disappeared after prolonged cultivation. This hemolysin was thermolabile, it decomposed readily, was precipitated by alcohol with loss of strength and had an affinity for lipoids. Its activity was inhibited by Fränkel's immune serum and in amounts in which normal sera or gas oedema sera show no activity. Exudates produced by the bacilli contained this specific hemolysin.—*H. D. Hooker, Jr.*

METABOLISM (NITROGEN RELATIONS)

4683. Bambacioni, Valeria. **Contribuzione alla conoscenza del luogo di formazione del sostanza organiche azotate nei vegetali.** [Contribution to our knowledge of the place of formation of organic nitrogenous substance in plants.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. 32²: 108–110. 1923.—From analyses of *Vicia Faba, Ricinus communis,* and *Cucurbita Pepo* plants and parts of plants kept in full nutrient solutions and in the same solutions lacking nitrogen he concludes: that all parts of the plant may manufacture organic nitrogenous substances; that the increase of these was greater in the roots than in the aerial parts; that in entire plants probably the protein substance migrates from the roots to the aerial parts since roots cut off and immersed in complete solutions contain more nitrogen than roots of entire plants immersed in such solutions.—*F. M. Blodgett.*

4684. Bay, Isidore. **Sur les produits de l'activité de la levure de bière en fonction de son alimentation azotée.** [The relation of the products of the activity of beer yeast to its nitrogen nutrition.] Compt. Rend. Soc. Biol. 89: 1044–1045. 1923.—The yeast was most active in forming alcohol and acid at 15°C. and with 1 gm. $(NH_4)_2CO_3$ per l. of nutrient solution.—*Oran Raber.*

4685. Fiske, Jessie G. **Report of the department of seed analysis.** Ann. Rept. New Jersey Agric. Exp. Sta. 43: 183–194. *2 pl.* 1921–22 [1924].—Results of tests with *Bacillus radicicola* showed that cultures stored at 30°C. for 5 months were no longer viable while those stored at 20°C. were. After 6 months of exposure to sunlight the vitality of the organism was greatly reduced. The results of a series of tests indicate that the use of an adhesive is of doubtful value in inoculating legumes.—*Wm. H. Martin.*

4686. Fred, E. B., and O. C. Bryan. **The effect of nodule bacteria on the yield and nitrogen of canning peas.** Soil Sci. 14: 413–415. 1922.—An analysis of peas, both inoculated and uninoculated, grown under field conditions showed a gain in yield of 179.0 pounds of tops and roots and 51.5 pounds of hulls and 13.2 pounds of N in favor of the inoculated set.—*W. J. Robbins.*

4687. Harris, Leslie J. **Use of the quinhydrone electrode for the estimation of amino acids, and of acid and basic functions.** Jour. Chem. Soc. 123: 3294–3313. 1923.—This electrode, which can be used only in solutions with a pH less than 8, is applicable to the estimation of acids and bases in colored solutions in which titration with indicators would be impossible. Methods are described by means of which the electrode may be utilized in the estimation of amino acids.—*F. E. Denny.*

4688. Jones, D. B., and C. E. F. Gersdorff. **Proteins of wheat bran. I. Isolation and elementary analysis of a globulin, albumin and prolamine.** Jour. Biol. Chem. 58: 117–131. 1923.—The total protein (N × 6.25) in wheat bran was found to be 17.25%. Three proteins were isolated. The percentages of these expressed in terms of the total protein in the bran were as follows: albumin 16.64, globulin 13.62, alcohol-soluble protein 31.01. All of them

contained sulphur. Details of the method of washing and drying the bran and of extracting the proteins are given.—*G. B. Rigg.*

4689. Komm, Ernst, und Eberhard Bohringer. **Ein Beitrag zur Tryptophan-Aldebyd-Reaktion. [Tryptophane aldehyde reaction.]** Zeitschr. Physiol. Chem. 124: 287–294. 1923.—A new modification of the reaction is described which is suitable for the colorimetric estimation of tryptophane content of proteins.—*Henry R. Kraybill.*

4690. Leavenworth, C. S., A. J. Wakeman, and T. B. Osborne. **Some basic substances from the juice of the alfalfa plant.** Jour. Biol. Chem. 58: 209–214. 1923.—Arginine, stachydrine, lysine, and an unidentified base were found.—*G. B. Rigg.*

4691. Prianichnikow. **Sur l'assimilation de l'ammoniaque par les plantes supérieures. [The assimilation of ammonia by higher plants.]** Compt. Rend. Acad. Sci. Paris 177: 603–606. 1923.—A comparison of the utilization of ammonium salts with that of nitrates was made. The 1st method consisted in determining the amount of N as asparagin produced by *Vicia Faba* and *Zea Mays* in solution cultures in 10 days, the amount being least in distilled H_2O, intermediate with $Ca(NO_3)_2$, and highest with $NH_4Cl + CaCO_3$. The organic N in mgm. per 100 zea plants found in the same solutions was, respectively, 755.6, 844.6, and 935.1. The 2nd method consisted in comparing the dry weight increase in cases in which the solution containing $(NH_4)_2SO_4$ was renewed with that in which it was not renewed. A 5–6-fold increase was secured by renewal, whereas with renewal of $NaNO_3$ solution the increase was less than 2-fold. In the 3rd experiment 4 ammonium salts were used in different concentrations, the readings being taken by measuring the length of stems and roots. In general a 0.001 *N* solution was found preferable to higher concentrations. Growth was best in NH_4HCO_3 with CO_2.—*C. H. Farr.*

METABOLISM (ENZYMES, FERMENTATION)

4692. Acklin, O. **Die Rolle der Bakterien bei der "Milchsäuregärung der Glucose durch Peptone." III. [The rôle of bacteria in "lactic acid fermentation of glucose by peptone."]** Biochem. Zeitschr. 142: 117–141. *2 fig.* 1923.—Incubation time, duration of fermentation, and amount of gas formed were determined by the number of bacteria present in the glucose-peptone-$NaHCO_3$ mixture, irrespective of the kind of peptone used. Incubation time and duration of fermentation were prolonged when the bacterial content was small and gas production seldom reached a maximum as in the presence of a larger number of bacteria. Curves of an autocatalytic nature were obtained. Conditions favoring the activity of these bacteria were investigated. A system containing 0.5% of acetate buffer was found to give the best results.—*H. D. Hooker, Jr.*

4693. Acklin, O. **Die Rolle der Bakterien bei der "Milchsäuregärung der Glucose durch Peptone." IV. [The rôle of bacteria in the "lactic acid fermentation of glucose by peptone."]** Biochem.Zeitschr. 142: 351–359. 1923.—The course of bacterial fermentation was not materially affected by the sterilization of peptone or glucose. However, deHaen's membrane filter is recommended for sterilizing materials used in fermentation experiments.—*H. D. Hooker, Jr.*

4694. Akamatsu, S. **Phytochemiche Reduktion in der Cyclohexanreihe. [Phytochemical reduction of cyclo-hexanone derivatives.]** Biochem. Zeitschr. 142: 188–190. 1923.—*o*-Methyl cyclo-hexanone was reduced by fermenting yeast to *o*-methyl cyclo-hexanol.—*H. D. Hooker, Jr.*

4695. Akamatsu, S. **Über das Vorkommen von Glycero-Phosphatase in der "Takadiastase." [The presence of glycero-phosphatase in Takadiastase.]** Biochem. Zeitschr. 142: 184–185. 1923.—Disodium glycerol phosphate was decomposed by Taka diastase to phosphate and glycerol.—*H. D. Hooker, Jr.*

4696. Akamatsu, S. **Über Lecithinspaltung durch "Takadiastase." [Lecithin cleavage by Taka diastase.]** Biochem. Zeitschr. 142: 186–187. 1923.—Phosphoric acid was split from lecithin by Taka diastase.—*H. D. Hooker, Jr.*

4697. Amos, A., and G. Williams. **Temperature and other factors affecting the quality of silage.** Jour. Agric. Sci. 12: 323–336. 1922.—The literature explaining the effect of temperature of fermentation on the quality of the silage produced is reviewed. It is shown that

5 types of silage may be produced from the same crop, varying according to the conditions of ensiling. These types are indicated as sweet dark-brown silage, acid light-brown silage, green fruity silage, sour silage, and musty silage. Temperature, age when cut, stage of wilting, run-off juice, and moisture content all induce changes in silage condition.—*R. P. Marsh.*

4698. Amos, A., and H. E. Woodman. **An investigation into the changes which occur during the ensilage of oats and tares.** Jour. Agric. Sci. 12: 337–362. 1922.—Chemical analyses of the fresh materials were made. The samples were allowed to ferment in silos, and the maximum fermentation temperature was determined. Tests were made both on freshly cut material and on material that had wilted for 96 hours. The highest fermentation temperatures on various samples ranged from 22.5 to 39°C. Losses in both moisture and dry matter after ensiling were recorded. Silage made from the freshly cut crop is recommended as a desirable type; however, loss of nutrients may occur through loss of juice.—*R. P. Marsh.*

4699. Butkewitch, W. **Über die "Citronensäuregärung."** [**Citric acid fermentation.**] Biochem. Zeitschr. **142**: 195–211. 1923.—Cultures of *Aspergillus niger* and *Citromyces glaber* on quinic acid produced no citric acid. In the presence of bases, oxalic acid only was produced. Citric acid formation proceeded best where hexoses were present, to a smaller extent in the presence of glycerol, and to a still smaller degree in the presence of arabinose or mannitol. Gluconic and saccharic acids did not lead to citric acid formation in *Aspergillus niger* cultures. Citric acid formation is not thought to be associated with alcoholic fermentation. Citric acid is considered to be formed from hexoses by the intermediate formation of an acid related to parasaccharinic acid. Such an acid accumulated in *Aspergillus niger* cultures under certain conditions. The hexose molecule is thought to be split into a 2- and a 4-carbon chain or into a 1- and a 5-carbon chain; and the intermediate acid, from which citric acid is formed, is produced by a condensation of the cleavage products of the hexose to give a branched carbon chain compound.—*H. D. Hooker, Jr.*

4700. Chrzaszcz, T. **Einfluss der Temperatur auf die Wirkung der Amylase. Die Wirkung der verzuckernden Kraft der Amylase.** [**The effect of temperature on amylase activity.**] Biochem. Zeitschr. **142**: 417–439. *1 fig.* 1923.—Amylase activity was measured by determining by Betrand's method the sugar produced. The amylase was obtained as an aqueous solution from the malts of rye, wheat, oats, buckwheat, maize, barley, broom-corn millet and African millet. Extracts made by prolonged shaking gave a precipitate when warmed above 50°C. When shaken for only 30 minutes, no precipitate appeared until the extract was warmed to 55–60°C. The rye-malt extract became opalescent only when warmed to 80°C. Precipitates formed below 50°C. had no effect on the amylase activity of the extract. Amylases from different sources did not respond to temperature in the same manner. At the optimum H-ion concentration (pH 4.9), the optimum temperature was 49–54°C. for barley-malt amylase, 49–55°C. for rye and wheat, 51–53°C. for oats, and 50–55°C. for buckwheat. In each case the upper limit is 1° below the temperature at which amylase destruction begins. For maize-malt amylase, the optimum temperature was 56–57°C.; for millet, 58–59°C.; and for African millet, 62–64°C., the lower limit in each case being 2° above the temperature at which destruction of amylase commences. Barley-malt amylase was completely destroyed at 61–62°C.; rye and wheat amylase, at 63–64°C.; and the others, 65–66°C. At 75°C. plant amylase was destroyed in 1 hour. The amylase of each grain showed constant properties only when used in amounts small in comparison to the starch.—*H. D. Hooker, Jr.*

4701. Euler, H. v., und K. Myrback. **Kinetische Untersuchungen an Saccharase.** [**Kinetics of sucrase action.**] Zeitschr. Physiol. Chem. **124**: 159–170. 1923.—From experimental data the authors calculated the value of *KM* in the equation $\frac{\text{enzyme} + \text{substrat}}{\text{enzyme} - \text{substrat}} = KM$, obtaining the values 0.027, 0.0175, and 0.020. They conclude that the assumption of the combination of 1 molecule of enzyme with 1 of substrate is hypothetical, and that such a combination holds for all proportions is not substantiated.—*Henry R. Kraybill.*

4702. Euler, H. v., und K. Myrback. **Über die Inaktivierung der Saccharase durch p-Phenylendiamin, p-Toluidin und durch Formaldehyd.** [**Inactivation of sucrase by p-phenylenediamine, p-toluidine, and formaldehyde.**] Zeitschr. Physiol. Chem. **125**: 297–314. 1923.—In equal molecular concentrations *p*-phenylenediamine is more effective than *p*-toluidine in

inactivating sucrase. An increase in the concentration of sucrose reduces the amount of enzyme inactivated by *p*-phenylenediamine. The inhibiting action upon sucrase of *p*-phenylendiamine, *p*-toluidine, and formaldehyde depends upon the reaction; in the more acid solutions they are less effective.—*Henry R. Kraybill.*

4703. Hagihara, J. **Über den Einfluss von Kolloiden auf Fermente. II.** [**The action of colloids on enzymes.**] Biochem. Zeitschr. **142**: 222–227. 1923.—The activity of enzymes such as malt diastase and Taka diastase was decreased in the presence of a cholesterol suspension at certain H-ion concentrations; at others no effect was evident. Lecithin in suspension also decreased enzyme activity except when present in very weak concentrations, under which circumstances no effect was evident.—*H. D. Hooker, Jr.*

4704. Kato, N. **Fermente und Licht. III. Urease. II.** [**Enzymes and light. Urease.**] Biochem. Zeitschr. **142**: 228–238. 1923.—In the absence of buffer materials, sunlight injured both soybean urease and the unknown constituent "x." Addition of KH_2PO_4 decreased the injury to urease produced by exposure to sunlight but not that produced by exposure to quartz-lamp light. The latter did not injure the constituent "x" as much as did sunlight, even when the reaction of the urease solution was neutral.—*H. D. Hooker, Jr.*

4705. Koga, T. **Zur Frage der Differenzierung tierischer und pflanzlicher Diastasen.** [**The differentiation of animal and plant diastases.**] Biochem. Zeitschr. **142**: 159–164. 1923.—Taka diastase, malt diastase, and diastase from *Amylomyces Delamar* were not activated by serum or by 1% NaCl. The diastases of *Bacterium coli* and *B. pyocyaneus* were activated by dilute serum in the same manner as animal diastases.—*H. D. Hooker, Jr.*

4706. Nelson, J. M., and F. Hollander. **Uniformity in invertase action.** Jour. Biol. Chem. **58**: 291–304. 1923.—A method has been devised for studying conditions requisite to the formation of collodion membranes of high permeability, and a simple procedure is outlined for the preparation of a series of membranes of any desired grade, provided only that the grade desired is within the limit fixed by the fragility of the membrane. Under obvious precautions the suitability of such membranes for the study of invertase diffusibility has been established.—*G. B. Rigg.*

4707. Neuberg, C., und K. Linhardt. **Über Sulfatase. II.** [**Sulfatase.**] Biochem. Zeitschr. **142**: 191–194. 1923.—Potassium *p*-cresol sulphonate was decomposed by sulfatase in Taka diastase to *p*-cresol and sulphate. This enzyme does not occur in large amounts in Taka diastase but is very stable.—*H. D. Hooker, Jr.*

4708. Nitzescu, I. I., et I. Cosma. **Ferments oxydants dans les parties constitutives des graines de haricot et de Soja.** [**Oxidases in the constituent parts of the bean and soybean.**] Compt. Rend. Soc. Biol. **89**: 1247–1250. 1923.—Both in the common bean, *Phaseolus vulgaris*, and in *Soja* oxidases were found in the embryo and in the cotyledons but not in the integuments. Since the oxidases are more abundant in the embryo than in the cotyledons the conclusion is reached that the oxidase activity varies with the "vitality" of the region. —*Oran Raber.*

4709. Pincussen, L. **Über den Einfluss von Kolloiden auf Fermente I.** [**The action of colloids on enzymes.**] Biochem. Zeitschr. **142**: 212–221. 1923.—The activity of a number of enzymes, including malt diastase and Taka diastase, was depressed by colloidal iron hydroxide. In some cases enzyme activity was increased at certain H-ion concentrations and frequently no effect was evident at the isoelectric point.—*H. D. Hooker, Jr.*

4710. Ringer, W. E. **Einfluss der Reaktion auf die Wirkung des Trypsins. 2 Mitteilung.** [**Effect of reaction on the action of trypsin.**] Zeitschr. Physiol. Chem. **124**: 171–193. 1923.—Increasing degrees of alkalinity favor the action of trypsin on dissolved blood serum protein until the effect of its destruction of the enzyme acts as a limiting factor. The thiocyanates, sulphates, and ferrocyanides which retard pepsin action on fibrin influence trypsin only slightly. The salts of higher valent cations such as the calcium salts retard the action of trypsin and also have a marked effect on the swelling of fibrin as well as on the hydration of alkaline protein solutions. The divalent cations in concentrations up to 0.025 *N* apparently retard the action of trypsin on dissolved protein at the start but the effect very soon disappears. Bile salts retard the solvent action of trypsin on fibrin but not the splitting of the dissolved protein and have no significant influence on the hydration of fibrin. The author

believes that the inhibiting effect of bile salts upon the solvent action of trypsin or fibrin is due to their strong surface activity.—*Henry R. Kraybill.*

4711. Rona, P., und Emerich Bach. **Beiträge zum Studium der Giftwirkung: Über die Wirkung des m- und p-Nitrophenols auf Invertase.** [**Contributions to the study of toxic action: the action of m- and p-nitrophenol on invertase.**] Biochem. Zeitschr. 118: 232–253. *6 fig.* 1921.—The toxicity of *m*- and *p*-nitrophenol on invertase varies with the time. There is a distinct minimum concentration value for the toxic action of the nitrophenol, which under the conditions of the experiment was 0.06M for *m*-nitrophenol and 0.04M for *p*-nitrophenol. From this point upwards the toxicity is proportional to the concentration. Double the minimum concentration causes a total loss of invertase activity. The process is not reversible and no influence of H-ion concentration was determinable, thus differing from the action of quinine. Temperature exerts a very strong influence; the average temperature coefficient being 1.87. Theoretical considerations are left for a later paper. —*Oran Raber.*

4712. Sjöberg, K. **Beiträge zur Kenntniss der Amylase in Pflanzen. III.** [**Plant amylase.**] Biochem. Zeitschr. 142: 274–279. 1923.—Amylase activity was determined in leaves and blossoms of tulips grown in the light, and in the leaves, stalks and blossoms of tulips grown in the dark. The amount of enzyme was greater in younger plants. No great difference was found in the enzyme content of the 2 groups. Amylase formation therefore appears to be independent of light and the presence of starch. The amylase activity of buds, stem, cotyledons, and roots of *Pisum sativum* was determined. That in the roots was much less than in the portions of the plant above ground. Amylase is thought to be involved in synthesis as well as in hydrolysis.—*H. D. Hooker, Jr.*

4713. Speakman, H. B. **Molecular configuration in the sugars and acid production by Bacillus granulobacter pectinovorum.** Jour. Biol. Chem. 58: 395–413. 1923.—The non-volatile acid produced from starch and sugars by the organism has been identified as lactic acid. The formation of acetic, butyric and lactic acids has been quantitatively studied during the fermentation of starch, arabinose, xylose, glucose, galactose, and mannitol. The possible influence of suitably placed adjacent OH groups of fermentable sugars on the fermentation products is discussed.—*G. B. Rigg.*

4714. Supniewski, J. **Recherches sur la transformation des combinaisons carbonées par le Bacille pyocanique.** [**The transformation of carbon compounds by B. pyocyaneus.**] Compt. Rend. Soc. Biol. 89: 1377–1379. 1923.—*B. pyocyaneus* in a medium containing fatty acid compounds oxidizes the COOH group and the medium becomes alkaline. If the medium contains compounds with OH, CO, or COH radicals these are oxidized to COOH and the medium becomes acid. The medium never becomes more alkaline than pH 8.8 as growth is stopped at that point; for the same reason the medium never becomes more acid than pH 6.6. More complex fats are broken down to CO_2 and by means of the energy derived from oxidizing NH_3 to N, the C is assimilated if other sources of energy are lacking. If other organic compounds are present the NH_3 is not oxidized but is assimilated parallel with the decomposition of the organic compounds. [See also following entry.]—*Oran Raber.*

4715. Supniewski, J. **Recherches sur la transformation des combinaisons azotées par le Bacille pyocyanique.** [**The transformation of nitrogen compounds by B. pyocyaneus.**] Compt. Rend. Soc. Biol. 89: 1379–1380. 1923.—*B. pyocyaneus* can assimilate N only as NH_3. It transforms all other N compounds either by reduction or deaminization to NH_3. The formation of NH_3 makes the medium alkaline, which proceeds parallel with the breaking down of the COOH groups. [See also previous entry.]—*Oran Raber.*

METABOLISM (RESPIRATION, AERATION)

4716. Harvey, E. N., and T. J. Morrison. **The minimum concentration of oxygen for luminescence by luminous bacteria.** Jour. Gen. Physiol. 6: 13–19. *Fig. 1.* 1923.—A method is described for measuring the concentration of O_2 to allow just perceptible luminescence of luminous bacteria. It was found that a concentration of O_2 equivalent to 0.005 mm. Hg pressure was sufficient for the bacteria to become luminescent so that light could be detected by the dark-adapted eye.—*O. L. Inman.*

4717. Lundin, H. **Über den Einfluss des Sauerstoffes auf die assimilatorische und dissimilatorische Tätigkeit der Hefe. III. Verhalten zugesezten Alkohols in Hefesuspensionen. [The influence of oxygen on yeast metabolism. The effect of alcohol added to suspensions of yeast.]** Biochem. Zeitschr. **142**: 454–462. *1 fig.* 1923.—Alcohol added to yeast suspension was assimilated only when a stream of O_2 was passed through the mixture. Under these conditions the dry weight of the yeast increased and the number of cells remained constant, no nitrogen being supplied. Alcohol appeared to be oxidized and synthesized to carbohydrate, part of which was respired. The rate of assimilation was most rapid at the beginning of the experiment and assimilation continued as long as alcohol was present. Previous experiments are reviewed and discussed.—*H. D. Hooker, Jr.*

4718. Lundin, H. **Über den Einfluss des Sauerstoffes auf die assimilatorische und dissimilatorische Tätigkeit der Hefe. IV. Verhalten einiger organischer Säuren. [The influence of oxygen on yeast metabolism. The effect of some organic acids.]** Biochem. Zeitschr. **142**: 463–492. *1 fig.* 1923.—Potassium aceto-acetate added to yeast suspension was assimilated in amounts ranging from 15 to 20% when a stream of O_2 was passed through the mixture. The dry weight of the yeast increased and the number of cells remained constant, no nitrogen being supplied. The sodium and ammonium salts of citric, malic, tartaric and succinic acid were not assimilated. Assimilation of the aceto-acetate proceeded more rapidly in a 1% solution than in a 3% solution. As the aceto-acetate disappeared, K_2CO_3 accumulated in the solution and increased its alkalinity. It is assumed that the aceto-acetic acid is split into CO_2 and acetone and that the nascent acetone is assimilated in the presence of O_2.—*H. D. Hooker, Jr.*

4719. McGinnis, F. W., and G. S. Taylor. **The effect of respiration upon the protein percentage of wheat, oats, and barley.** Jour. Agric. Res. **24**: 1041–1048. 1923.—The loss of carbohydrate material, as calculated from the CO_2 evolved by 25-grain samples, during the ripening of the wheat, oats and barley grains is considerable. The protein percentage of wheat, oats and barley is influenced to a marked degree by the loss of carbohydrate during the ripening period, and varies widely in the grain grown at 17 stations representing extremes so far as quality of grain produced is concerned. Factors other than respiration contribute largely to the formation of high protein grains. Wheat is more variable in the protein percentage than barley or oats and barley appears to be more variable than oats.—*F. W. McGinnis.*

4720. Smith, Edith Philip. **Buffer effects of tap-water in the estimation of carbon dioxide by change in hydrogen-ion concentration.** Ann. Botany **37**: 344–346. 1923.—Water from the Edinburgh main supply was boiled until free from CO_2 and titrated with a standard solution of CO_2 which was approximately saturated and showed a pH of 5.0. The results are expressed by a curve. The results do not apply directly to tap-water in other places, but the method described should be generally applicable. The author concludes that tap-water has a decided buffer action. This relation may be expressed by a titration curve from which may be deduced the change in pH resulting from equal amounts of CO_2 produced by respiration or in other ways.—*W. E. Maneval.*

4721. Warburg, O. **Über die Grundlagen der Wielandschen Atmungstheorie. [The basis of Wieland's theory of respiration.]** Biochem. Zeitschr. **142**: 518–523. 1923.—The author's theory of respiration, that molecular oxygen combines with iron and that organic compounds are oxidized by the iron oxide, is considered preferable to Wieland's theory that oxygen combines directly with the hydrogen of the organic molecule. The preference is based primarily on the cessation of respiration caused by HCN, which is thought to combine with the iron of the cell. The formation of H_2O_2 and the role of catalases is questioned.—*H. D. Hooker, Jr.*

ORGANISM AS A WHOLE

4722. Bachelier, P. **Experiences sur le trempage des semences. [Experiments on soaking seed.]** Compt. Rend. Acad. Agric. France **1920**: 712–716. 1920.—The author soaked seed of barley in different solutions before planting to determine the effect, if any, upon the development and yield of grain. The tests were made in triplicate, as follows: (1) no treat-

ment; (2) soaked in impure water; (3) soaked in KNO_3 100 gm. per l.; (4) soaked in KNO_3, 200 gm. per l.; (5) soaked in NH_4NO_3, 100 gm. per l.; (6) soaked in NH_4NO_3, 200 gm. per l.; (7) sprayed with NH_4NO_3, 200 gm. per l. The soaking lasted for 6 hours, followed by drainage for 18 hours. The soaked seed took up 180 gm. of substance for each l. of grain; the sprayed grain only 60 gm. The order of appearance of seedlings in the plots was 2, 1 and 7, 3, 4 and 5, 6. The order as to yield of grain in 1919, a very dry season was 2, 1, 7, 3, 4, 5, 6, showing that salts were harmful to the yield. In 1920, a moister season, the differences were not so clear cut.—*Ernst A. Bessey.*

4723. Berdnikow, A. **Des cultures en milieu a écoulement constant.** [**Cultures in a constantly changing medium.**] Compt. Rend. Soc. Biol. **89**: 885–887. *1 fig.* 1923.—Since bacteria stop growing when the medium is unchanged either due to the exhaustion of nutrient materials or to the formation of toxic by-products, it is desirable to have a method by which the medium can be constantly changed without disturbing the culture. Such a method is described by which the medium is siphoned through the culture tube. The efficacy of such an apparatus is shown by the fact that *B. coli* cultivated in this manner retains its motility a month whereas in an ordinary culture the motility is lost after 1 week.—*Oran Raber.*

4724. Brody, Samuel. **The kinetics of senescence.** Jour. Gen. Physiol. **6**: 245–257. *Fig. 1–7.* 1924.—The course of decline of vitality with age due to the process of senescence, when not complicated by the process of growth, follows a simple exponential law; i.e., the degree of vitality or of senescence (defining vitality as the reciprocal of senescence) at any moment is, regardless of age, a constant percentage of the degree of vitality or senescence of the preceding moment. This exponential law is the same as the law of monomolecular change in chemistry. During growth the index of vitality rises and falls and it often requires an equation containing 2 exponential terms to express any relationship to monomolecular chemical reactions.—*O. L. Inman.*

4725. Brown, H. D. **Studies relating to the biology of activated sludge.** Div. Sanitary Engineering, Provincial Bd. of Health, Ontario, Canada, Ann. Rept. **1921** (Bull. No. 10): 127–131. 1921.—Protozoan counts—flagellates, ciliates and amoebae—were made on the contents of an experimental activated sludge plant and it was noted that the number varied in proportion to the suspended matter present, and was highest where the sludge-water ratio was greatest. The raw water contained 200–600 per cc., the returned sludge 18,000–45,000, and the effluent very few. Strongly aerobic conditions were favorable to the protozoa, the number in sewage increasing and the bacteria decreasing on prolonged aeration, while anaerobic conditions were detrimental, few living forms surviving in unaerated samples after 7 days. From experiments on the effect of adjustment of the pH it was evident that acidity (pH 4.3) was very deleterious to protozoa and that the number could easily be controlled by regulating the H-ion concentration. An acid sludge also gave a turbid supernatant liquid, while an alkaline sludge settled rapidly. It was found that aeration for 30 minutes with toluened air effectively reduced the number of protozoa without affecting the bacterial count to nearly so marked a degree. The protozoan content approximated 1,000,000 per gm. of wet sludge.—*Rudolph E. Thompson.*

4726. Coons, G. H. **Tests of dehydrated culture media.** [Abstract.] Phytopathology **14**: 65. 1924.

4727. Costa, S., et L. Boyer. **Emploi de la gélose a la gomme adragante pour la recherche et l'isolement du Méningocoque, chez les malades et chez les porteurs de germes.** [**The use of agar and gum tragacanth in the study of Meningococcus.**] Compt. Rend. Soc. Biol. **89**: 1061–1062. 1923.

4728. Dickson, James G. **Control chambers for plant environmental studies.** [Abstract.] Phytopathology **14**: 64–65. 1924.

4729. Fuchs, A., und H. Ziegenspeck. **Aus der Monographie des Orchis Traunsteineri Saut.** [**From a monograph on Orchis Traunsteineri Saut.**] Bot. Archiv **2**: 238–248. *4 fig.* 1922.—Stages in the development of orchid seeds, representing many species, infected with a great variety of orchid fungi are described.—*William Seifriz.*

4730. Fulmer, E. I., V. E. Nelson, and Anne White. **The growth of yeast on a medium of wholly synthetic origin.** Jour. Biol. Chem. **57**: 397–399. 1923.—Yeast was subcultured on

a medium wholly synthetic in origin, consisting of H_2O, NH_4Cl, K_2HPO_4, $CaCl_2$, $CaCO_3$, and methose, the last ingredient being prepared in the laboratory from formaldehyde.—*G. B. Rigg.*

4731. Harter, L. L., and J. L. Weimer. **Some physiological variations in strains of Rhizopus nigricans.** Jour. Agric. Res. **26**: 363–371. 1923[1924].—The parasitism, temperature relations, H-ion product on, and pectinase secretion were studied for 18 isolations of *Rhizopus nigricans* derived from hosts widely separated botanically. All were parasitic on sweet potatoes. The optimum temperature for spore germination was about 31°C. with 1 exception, which had an optimum somewhat lower. The maximum was between 33.5 and 35.5°C., with the exception noted above, which had a maximum close to 31°C. The spores of some isolations germinated at 1.8°C. The optimum temperature for mycelial growth was about 26.2°C. and the maximum near 31°C. The results show that the spores germinate at a temperature several degrees higher than that at which the mycelium grows. None of the strains produced a cell-wall-destroying enzym (pectinase) when grown on sweet-potato decoction. With 1 exception the acidity of the substrate (sweet-potato decoction) was decreased.—*L. L. Harter.*

4732. Hurd, Annie May. **Acidity of corn and its relation to vegetative vigor.** Jour. Agric. Res. **25**: 457–469. *2 fig.* 1923.—Titratable acidity and H-ion concentration of expressed juice of corn are inversely correlated with vegetative vigor. The pH values of tops of plants 5–7 weeks old ranged from 5.0 for stunted, slow-growing plants to 5.6 for vigorous, rapidly growing ones. The titratable-acid concentration varied correspondingly, the values ranging from about 10 cc. 0.05 *N* NaOH required to neutralize 10 cc. of juice from the most stunted plants, to 5 cc. or less for the most vigorous ones. Environmental conditions produced far greater variations in the acidity of plants of the same strain than were ever found between equally vigorous plants of different strains in the same environment. Less variation of acidity with vigor was found in the juice of leaves than in that of stalks. The titratable acidity of the leaves was always higher than that of the stalk of the same plant but this relation was not always true of the H-ion concentrations. The most stunted plants were characterized by a higher H-ion concentration in the stalk in spite of the fact that the leaves possessed the higher concentration of titratable acid. The specific gravity of the juice of leaves was always much higher than that of the stalk regardless of vigor. The specific gravity of the sap sometimes varied directly with acid concentration but not always, so that it is concluded that, in general, variations in water content of the tissues were not responsible for the variations in acid concentration.—*Author.*

4733. Leonian, Leon H. **On the physiology of the genus Phytophthora.** [Abstract.] Phytopathology **14**: 32. 1924.

4734. Mix, A. J. **Biological and cultural studies of Exoascaceae. I. Exoascus deformans (Berk.) Fuckel.** [Abstract.] Phytopathology **14**: 35. 1924.

4735. Mix, A. J. **Biological and cultural studies of Exoascaceae. II. Exoascus mirabilis Atkinson.** [Abstract.] Phytopathology **14**: 35. 1924.

GROWTH, DEVELOPMENT, REPRODUCTION

4736. Carrel, Alexis. **Tissue culture and cell physiology.** Physiol. Reviews **4**: 1–20. 1924. [With bibliography.]

4737. Lamberg, Gerhard. **Das Licht als Wachstumsfaktor. [Light as a growth factor.]** Bot. Archiv **2**: 213–228. *2 fig.* 1922.—The growth factor "light" is constant. The minimum light intensity is not an absolute value but is dependent upon (a) heat, (b) species, and (c) whether calculated on the basis of green weight, dry weight, or seed production, being least for the first and most for the last.—*William Seifriz.*

4738. Schmidt, David. **A study of plant growth in relation to the weight of seed.** Ann. Rept. New Jersey Agric. Exp. Sta. **43**: 388–394. *2 fig.* 1921/22 [1924].—Data reported on soybean, buckwheat, and radish indicate that the average dry weight, green weight, and leaf-area measurements of plants grown from seeds of heavier weight are always superior to those of plants grown from seeds of lighter weight.—*Wm. H. Martin.*

4739. Sierakowski, Stanislaw, Z. Modrzewska, H. Rabinowicz, et E. Salamon. **Recherches sur les milieux de culture. Influence de différents agents sur la croissance des bactéries pathogènes dans les milieux gélosés.** [Researches on culture media. Influence of various agents on growth of pathogenic bacteria on agar media.] Compt. Rend. Soc. Biol. 89: 1386–1389. 1923.—*B. typhosus*, *B. coli*, and *Microspira comma* were among the forms studied. Growth is nearly proportional within limits to the amount of peptone and meat extract in the medium. *B. typhosus* grows well in media 1.5 cm. deep; but *Microspira* and *B. coli* grow progressively less readily below the surface in deep media. The medium is exhausted only where the bacteria grow. At 36°C. growth is very limited the first 6 hours, rapid during the next 12 hours, and then becomes almost nil. The optimum temperature is 31–37°C. *B. coli* grows best at pH 6.0, *B. typhosus* at pH 6.4, and *M. comma* at pH 7.0. There is much variation in the amount of NaCl which permits optimum growth.—*Oran Raber.*

GERMINATION, RENEWAL OF ACTIVITY

4740. Munerati, O. **Sul meccanismo della germinazione dei grani in mannelli o covoni a seguito di poigge che accompagnano o seguono la mietitura.** [On the mechanism of germination of grain in bundles or shocks as a consequence of rain accompanying or following harvest. Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e Nat. 32^2: 35–36. 1923.—In a brief article, details to be given elsewhere, observations are summarized confirming those previously reported, that a lowering of temperature is essential in causing grain sprouting in bundles at harvest time.—*F. M. Blodgett.*

4741. Schribaux, Emile. **Vitalité des graines de betteraves dans le sol.** [Vitality of beet seed in the soil.] Compt. Rend. Acad. Agric. France 1920: 799–801. 1920.—In a field sown in 1920 to sugar beets a few plants of a green-necked beet appeared, the seed of which had lain dormant in the soil since the preceding crop, in 1913. Other plants were found in a field where this variety had been grown for seed in 1918. This is explained by the presence of hard seed in a certain proportion of the seed balls. The year 1920 was especially favorable for the germination of hard seed of many wild plants.—*Ernst A. Bessey.*

4742. Uppal, B. N. **Spore germination of Phytophthora infestans.** [Abstract.] Phytopathology 14: 32–33. 1924.

TEMPERATURE RELATIONS

4743. Bowen, John T. **Methods for close automatic control of incubating temperatures in laboratories.** U. S. Dept. Agric. Bull. 951. *16 p., 13 fig.* 1921.

4744. Bowen, John T. **A method of automatic control of low temperatures, employed by the United States Department of Agriculture.** Jour. Agric. Res. 26: 183–190. *4 fig.* 1923.—The difficulties encountered in accurate control of temperatures below that of the surrounding air and the methods employed in overcoming them, both when the chambers are located in-doors and when exposed to sunlight, are discussed. Drawings and wiring diagrams are given of the system employed and temperature charts showing the actual results obtained in practice. The most suitable type of refrigerating machine, its installation, and the refrigerant to be used when intended for the study of plant life are also discussed.—*Author.*

4745. Hickman, Kenneth Claude Devereux. **A thermostat refrigerator.** Jour. Chem. Soc. 123: 3416–3417. *2 fig.* 1923.—The apparatus was used to maintain a bath at 15° ± 0.05°. It can also be modified for temperatures higher than room temperature.—*F. E. Denny.*

4746. Miller, Edwin C., and A. R. Saunders. **Some observations on the temperature of the leaves of crop plants.** Jour. Agric. Res. 26: 15–43. *8 fig.* 1923.—With a thermoelectrical device approximately 20,000 observations were made in studying the relationships of air temperature to that of attached leaves of plants growing under field conditions at Manhattan, Kansas. For many determinations from 9 a.m. to 4 p.m., the average temperature of wilted leaves of corn, sorghum, soybeans, and cowpeas was respectively 1.85, 1.55, 2.8, and 4.65°C. higher than the temperature of the turgid leaves of these plants under conditions which were the same except for the amount of water in the soil. During the transpiration-temperature experiments, the percentage of available water in the soil above the wilting

coefficient was 2–4% for the wilted plants and 10–12% for the turgid plants. The ratio of the rate of transpiration of the turgid leaves to that of the wilted leaves was 2.5:1 in corn and sorghum, and 3.5:1 in cowpeas and soybeans. In the early morning and evening and when general climatic conditions are relatively mild, the temperature of turgid leaves is slightly below that of the surrounding air. The night temperature of leaves is approximately that of the surrounding air. From 9 a.m. to 4 p.m., however, under the climatic conditions prevailing during the growing season in Kansas, different species of plants behave differently as regards temperature relationship of their turgid leaves and the surrounding air. The temperature of turgid leaves of corn, sorghum, pumpkin and watermelon in direct sunlight may fluctuate slightly above or below the air temperature, but the average of the leaves is approximately that of the surrounding air. In corn, the average of over 1,000 determinations of leaf temperature under a wide range of conditions was 30.64°C., while the average air temperature for an equal number of determinations during that time was 30.58°C. A thousand observations on the temperature of sorghum leaves and the surrounding air showed an average of 30.64°C. for the former and 30.66°C. for the latter. The average temperature of turgid leaves of soybeans in 500 observations was 33.66°C., while the average temperature of the air was 33.13°C. The average of 500 temperature observations on cowpea leaves was 0.2°C. lower than the average temperature of the surrounding air, while alfalfa leaves were consistently somewhat less than 1°C. below the temperature of the air. The experiments with leaves in direct sunlight showed that the temperature of the leaf base is always lower than that of the apical region, this difference varying from 1 to 1.5°C., depending upon the nature of the leaf and upon the available water supply. The data show that in diffuse sunlight the temperature of attached turgid leaves of the plants studied is always lower than that of the surrounding air, the average difference varying from 0.1 to 3°C. (maximum difference observed was 5°C.). In direct sunlight the temperature of turgid leaves of most plants fluctuates above and below the air temperature, but as soon as clouds obscure the sun the leaf temperature almost immediately drops below that of the air and remains there until the leaf is again exposed to direct sunlight.—*Edwin C. Miller.*

4747. Saillard, Emile, et Wehrung. **Action de la chaleur sur les graines de betteraves à sucre. [Effect of heat upon sugar beet seed.]** Compt. Rend. Acad. Agric. France 1920: 91–92, 308–311. 1920.—Sugar beet seed of 3 classes, very good 98%, good 87%, and mediocre 36% germination, were subjected to dry heat of different temperatures for varying lengths of time and then germinated. The germination of the first 2 classes was unimpaired by exposure to 60–70°C. for 1 hour; the poor seed, however, were mostly killed. The temperature of 80°C. for 1 hour delayed but did not reduce the germination of the 2 better grades of seed. —*Ernst A. Bessey.*

4748. Walker, J. C., and F. L. Wellman. **Temperature relations of Urocystis Cepulae (Frost).** [Abstract.] Phytopathology 14: 26. 1924.

RADIANT ENERGY RELATIONS

4749. Hartline, H. K. **Influence of light of very low intensity on phototropic reactions of animals.** Jour. Gen. Physiol. 6: 137–152. *Fig. 1–4.* 1923.—In a study of the effects of light on land isopods, especially *Oniscus*, the author found that using a large range of light intensities, especially low ones, enabled him to get responses from the organisms which could be determined quantitatively by measuring the angle through which an animal turned away from a line perpendicular to the radius of light. Over a large range of intensities (0.0025 m. candlepower and up) the average turning is maximal, about 55 degrees (Oniscus). This maximal response is due to an anatomical peculiarity in that the carapace cuts off the light on the eye after the animal has turned 50–60 degrees. Below 0.0026 m. candlepower the amount of angular deflection becomes less and less, in proportion to the logarithm of the light intensity, until at 0.00003 m. candlepower the movements are the same as in darkness. The proportionality between the amount of turning and the logarithm of the intensity indicates the photochemical nature of phototroprisms.—*O. L. Inman.*

4750. Reinhard, A. W. **De l'influence de la lumière sur la multiplication de la levure. [The influence of light on the multiplication of yeast.]** Compt. Rend. Soc. Biol. 89: 1080-1082. 1923.—*Saccharomyces cerevisiae* multiplies more rapidly in light than in darkness even in diffuse light where there is no increase in temperature. Yellow light is more favorable than blue light. Ultra-violet light slightly hinders development.—*Oran Raber.*

4751. Slosse, A. **L'action chimique de l'émanation des métaux radio-actifs. [The chemical action of the emanation from radioactive metals.]** Compt. Rend. Soc. Biol. 89: 812–814. 1923.—When glucose is subjected to radium emanations the optical activity is diminished and a small amount of the glucose is broken down to formaldehyde. If the glucose is subjected to radiations from thorium B, the optical activity is again diminished by about the same amount but the glucose is not decomposed. The change in rotatory power is thought to be due to the formation of γ glucose.—*Oran Raber.*

TOXIC AGENTS

4752. Donald, J. R., C. L. Jones, and A. R. M. MacLean. **The effect of carbonation on bacteria in beverages.** Amer. Jour. Public Health 14: 122–128. *6 fig.* 1924.—The bacterial content of plain bottled ginger ale and of the same impregnated with nitrogen at 75 pounds per square inch increased very rapidly after bottling, whether stored at room temperature (about 70°F.) or at blood temperature. The bacterial count of the same material carbonated at 15 pounds pressure (about 1.7 volumes of the gas) underwent a slight increase at first and then gradually became almost zero at the lower temperature; while at the higher temperature a zero count quickly followed. When carbonated at 75 pounds pressure (about 5.7 volumes) sterility was quickly produced. Ginger ale inoculated with *Bacterium typhosum* and *B. coli*, non-carbonated, and carbonated at 45 pounds pressure (about 3.5 volumes) and 70 pounds (about 4.8 volumes), respectively, gave similar results. The count in the uncarbonated beverage increased rapidly, in the less highly carbonated it increased slightly at first and then decreased, and in the more highly carbonated it decreased from the start.—*C. A. Ludwig.*

4753. Duthoit, A. **Valeur antiseptique de l'hexaméthylènetétramine in vitro. [Antiseptic value of hexamethylenetetramine in vitro.]** Compt. Rend. Soc. Biol. 89: 656–658. *1 fig.* 1923.—Using a 2% solution of hexamethylenetetramine in Ringer's solution with *B. typhosus*, *B. paratyphosus A* and *B*, *B. coli*, and the Pneumobacillus of Friedlander it was found that all the bacteria were killed in 4–10 days varying with the species. The toxicity of the solution varies with its concentration. In very weak solutions (0.1%) the bacteria are not killed but their growth is markedly hindered.—*Oran Raber.*

4754. Fairhall, L. T. **Lead studies. VIII. The microchemical detection of lead.** Jour. Biol. Chem. 57: 455–461. 1923.

4755. Fulmer, E. J., and R. E. Buchanan. **Studies on toxicity.** Jour. Gen. Physiol. 6: 77–89. *Fig. 1–6.* 1923.—The curves representing the survival of yeast cells subjected to the action of phenol or phenol and alcohol did not in general prove to be logarithmic. The criterion used to evaluate the surviving yeast cells was the resistance of the cells to staining with 0.01% methylene blue. There was variation in the resistance of individual cells in succumbing to the action of the toxic agent.—*O. L. Inman.*

4756. Hale, Harrison, and William L. Bleecker. **Active chlorin as a germicide for milk and milk products.** Jour. Agric. Res. 26: 375–382. *3 pl., 1 fig.* 1923 [1924].—The action of chlorin water, sodium hypochlorite, and calcium hypochlorite upon the bacterial content of milk was tried under varied conditions. One part of active chlorin was added to 1,000, 3,000, 5,000, 7,000, 10,000, 15,000, 20,000, and 50,000 parts of milk respectively in the usual tests. Market milk was generally used; also milk inoculated with *Staphylococcus pyogenes aureus*, with *Sarcina lutea*, and with *Bacillus coli communis*. It is concluded that (1) active chlorin acts as a germicide in milk and in ice cream with a reduction in the number of bacteria in general proportional to the amount of active chlorin present; (2) chlorin water gives as satisfactory results in 45 minutes as sodium hypochlorite does in 90 minutes or calcium hypochlorite in 19 hours. The chlorin water could be used in higher concentrations than the other 2 without affecting the flavor. It is not the wish of the authors that their paper be considered as recommending chlorin for treating market milk.—*H. Hale.*

4757. Mix, A. J., and Dorothy Lee Vaughn. **The range of toleration of hydrogen-ion concentration exhibited by Fusarium tracheiphilum in culture.** [Abstract.] Phytopathology **14**: 63. 1924.

4758. Pozerski, E. **Sur l'excrétion de produits phosphorés par le Bacille de Shiga amené à la limite de sa végétabilité soit par le chauffage, soit par l'addition de formol.** [**The excretion of phosphorus products by Shiga's Bacillus in which vegetative activity is stopped either by heating or the addition of formalin.**] Compt. Rend. Soc. Biol. **89**: 1094–1095. 1923.—The harmful action of heat and formalin on Shiga's Bacillus can not be compared. A minimum dose of formalin (1 part in 4,000) stops the vegetative activity in 3 hours but the excretion of P continues for at least 4 days. When the vegetative activity is stopped by heat the excretion is also stopped.—*Oran Raber.*

4759. Sabrazes, J. **Action de l'oxyde de carbone sur le développement du Staphylocoque doré.** [**Action of CO on the development of S. aureus.**] Compt. Rend. Soc. Biol. **89**: 1168–1169. 1923.—A culture of *S. aureus* grown in a vacuum was 6.5 times as abundant as one grown in an atmosphere of CO. This may explain why bodies asphyxiated by CO do not undergo bacterial decomposition so quickly as those in which death has resulted from other causes.—*Oran Raber.*

MISCELLANEOUS

4760. Hickman, Kenneth Claude Devereux. **An improved filter-pump.** Jour. Chem. Soc. **123**: 3414–3415. *1 fig.* 1923.—This is an improvement on the ordinary water-jet suction pump.—*F. E. Denny.*

4761. Hickman, Kenneth Claude Devereux. **A laboratory water motor.** Jour. Chem. Soc. **123**: 3415. *1 fig.* 1923.—A sketch is given showing a simple slow-speed motor affording a good turning moment.—*F. E. Denny.*

4762. Jessen-Hansen, Hans. **Sur le dosage de mélanges de saccharose et de sucre interverti ou de lactose.** [**Determination of mixtures of saccharose and invert sugar or lactose.**] Compt. Rend. Trav. Lab. Carlsberg **15**[3]: 1–21. 1923.—This is a re-determination and extension of tables previously published [Compt. Rend. Trav. Lab. Carlsberg **4**: 1895, and **4**: 1899] for the estimation of reducing sugars by the use of Fehling's solution. The cuprous oxide formed is reduced to Cu by means of H_2 and the metallic Cu is weighed. Tables are given for the conversion of reduced Cu into sugar values for pure solutions and mixtures.—*F. Weiss.*

4763. Kopaczewski, W. **Sur la mesure de la conductivité électrique en biologie.** [**The measurement of electrical conductivity in biology.**] Compt. Rend. Soc. Biol. **89**: 1183–1184. *1 fig.* 1923.—A compact apparatus with all connections made including resistance, head set, cell, etc., for making rapid conductivity determinations of fluids is described. A measurement can be made in 10 minutes including the time required to clean the cell.—*Oran Raber.*

4764. Saunders, Sidney Walter. **A new absorption pipette for gas analysis.** Jour. Chem. Soc. **123**: 2826–2828. *1 fig.* 1923.

4765. Yippö, Arvo Hendrick. **PH-tabellen, enthaltend ausgerechnet die Wasserstoffexponentwerte, die sich aus gemessenen Millivoltzahlen bei bestimmten Temperaturen ergeben gültig für die gesättigte Kalomel-Elektrode.** [pH tables, containing pH values calculated from the millivolts secured at given temperatures with the saturated calomel electrode.] *2nd unchanged ed., 75 p.* J. Springer: Berlin, 1922.

SOIL SCIENCE

A. G. McCALL, *Editor*

(See in this issue Entries 4076, 4081, 4090, 4092, 4097, 4101, 4105, 4300, 4320, 4322, 4339, 4340, 4631, 4638, 4641, 4645, 4646, 4649)

TAXONOMY OF VASCULAR PLANTS

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(See in this issue Entries 4157, 4166, 4167, 4170, 4171, 4197, 4207, 4208, 4209, 4249, 4253, 4254, 4309, 4334, 4337, 4348, 4564)

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

SAM F. TRELEASE, *Editor*

4766. ATKINS, W. R. G. **Hydrogen ion concentration of natural waters in relation to disease.** Jour. State Medicine 31: 223–226. 1923.—From a résumé of available literature and experience in all parts of the world, the writer concludes: (1) Natural waters vary in reaction from about pH 5, that of a bog water pool, to about pH 8.3 for a stream saturated with $Ca(HCO_3)_2$. Town supplies are normally between pH 6.8 and pH 8. (2) With the exception of bog waters and waters abnormally rich in metallic salts, such as mine drainage waters, it seems that naturally occurring waters are at pH values favorable to the continued existence of the *Vibrio cholerae* and bacilli of the typhoid group. (3) The sugestion is made that water may be rendered safe for drinking purposes by rendering it as alkaline as pH 10.5 or thereabouts by adding ash derived from vegetable matter, which is rich in the carbonates of potassium and sodium. (4) Attention is drawn to the necessity of stating temperatures when the limiting and optimal values are given for the growth of various organisms.—*H. N. Old.*

4767. INGE, W. R. **Science and man.** [Rev. of: MARVIN, F. S. (editor). **Science and civilization.** (The Unity Series, VI.) *350 p.* Oxford University Press: London, 1923.] Nature 112: 383–384. 1923.—The reviewer comments upon the relation of science and religion as discussed by Arthur Thompson and Julian Huxley, expressing his own opinion that "the two cannot be separated, and the salutary rivalry of scientific and religious truth must continue as long as men take both seriously." He finds no satisfaction in the idea that life on this planet is but a stage in evolution.—*O. A. Stevens.*

4768. NITZULESCU, VIRGIL. **Sur un nouveau milieu pour le montage des préparations microscopiques non colorées.** [A new medium for mounting uncolored microscopic preparations.] Compt. Rend. Soc. Biol. 89: 1065–1067. 1923.—The method of using sodium silicate as a mounting medium is described, and its advantages are pointed out.—*Oran Raber.*

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